INDEX

VOL. XVII. The Wireless Engineer & Experimental Wireless 1940

GENERAL INDEX

PAGE

ABSTRACTS AND REFERENCES. (*See separate Index*).
Acoustic Reactions and Quartz Crystal Vibrators, Electro-, A. T. Starr .. 247, 303
Admittance and Impedance, Symbolic Representation of (*Editorial*) 1
Air-Gapped Magnetic Circuit, The Inductor with (*Editorial*) 145
(*Correspondence*) 297
Amplitude, Frequency and Phase Modulation (*Editorial*) 197, 339
(*Correspondence*) 353, 441, 477 (*Correction*) 399
Amplitude Limiters, Noise Suppression by Means of, Martin Wald 432

Band-Pass Filters, Simple Treatment of (*Correspondence*) 110
Band-Spreading and its Effect on "Tuning Rate," F. H. Woodbridge 394
Battery-Operated Power Unit for Cathode-Ray Oscillographs, R. E. Burgess .. 296
Beams, Electron Density Distribution in Velocity-Modulated, D. Martineau Tombs 54
(*Correspondence*) 110, 202, 262
Behaviour of Resistors at High Frequencies, The (*Editorial*) 471
BOOKS:
Cathode-Ray Oscillographs, J. H. Reyner .. 309
Communications—Wire and Wireless, R. Barnard Way 64
Cyclotron, The, W. B. Mann 111
Direction-Finding Terminology 111
European Science, H. Stafford Hatfield .. 256
High Frequency Alternating Currents, K. McIlwain and J. G. Brainerd 20
History of the Post Office Engineering Department, The 18
Introducing Radio Receiver Servicing, E. M. Squire 526
Mathematical Tables, U.S. Bureau of Standards 393
N.P.L. Ionospheric Data Tables 205
N.P.L. 1939 Report 256
N.P.L. Research Abstracts 64
Photo-Electric and Selenium Cells, T. J. Fielding 398
Physics of the Divining Rod, The, J. C. Maby and T. B. Franklin 51
Principles of Television Engineering, Donald G. Fink 398
Quartz Oscillators and their Applications, P. Vigoureux 205
Radio Amateurs Handbook, 1940, The .. 64
Radio Designer's Handbook 526
Radio Interference Suppression: New and Revised B.S. Specifications 393

PAGE

BOOKS (*continued*):
Radio Service Trade Kinks, Lewis S. Simon 64
Radio at Ultra-High Frequencies 398
Radio Upkeep and Repairs (4th Edition), Alfred T. Witts 256
Servicing by Signal Tracing, John F. Rider 64
Telephony: Supplement to Volume II, T. E. Herbert and W. S. Proctor 397
Television, V. K. Zworykin 397
Television Receiving Equipment, W. T. Cocking 309
Wireless, C. L. Boltz 205
British Wireless Dinner Club Annual Gathering (*Illustration*) 163

Capacitance of a Triode Oscillator, Input, J. van Slooten 13
Cathode-Ray Oscillographs, Battery-Operated Power Unit for, R. E. Burgess 296
Cathode-Ray Tubes, Trapezium Distortion in, B. C. Fleming-Williams 61
Circuits, Non-Linear: Graphical Determination of Performance, J. Frommer and A. Rédl 4
(*Correction*) 60
Colour Code for Resistances and Fixed Condensers, R.M.A., New 399
Commutator Inverters, The Performance of, L. C. Stenning 517
Compensation of Moving-Iron Voltmeters, Frequency (*Editorial*) 429
Condensers, Variable Air: Determination of their Residual Parameters, R. Faraday Proctor 257
Conductance, Input: Measurement in High-Slope H.F. Amplifier Valves, F. Preisach and J. Zakariás 147
Crystal Vibrators and Electro-Acoustic Reactions, Quartz, A. T. Starr 247, 303

Design Tables of Resistance Networks, C. D. Colchester and M. W. Gough 206
Dielectric Losses in Radio Circuits, A. G. Bogle 198
Diode Operating Conditions (*Correspondence*) 19
Distortion in Cathode-Ray Tubes, Trapezium, B. C. Fleming-Williams 61
Divining Rod, The Physics of the (*Editorial*) .. 51

Earth's Surface, Wireless Waves at the (*Editorial*) 385
Electro-Acoustic Reactions with Special Reference to Quartz Crystal Vibrators, A. T. Starr 247, 303
Electron Density Distribution in Velocity-Modulated Beams, D. Martineau Tombs 54
(*Correspondence*) 110, 202 262

PAGE

Feedback, E. K. Sandeman 342
(*Correspondence*) 441
Flexible Glass Insulation 3
Frequency Compensation of Moving-Iron Voltmeters (*Editorial*) 429
Frequency Modulation by Phase Shifting the Side Bands of an Amplitude Modulated Wave, D. I. Lawson 388
Frequency, Phase and Amplitude Modulation (*Editorial*) 197, 339
(*Correspondence*) 353, 441, 477, 526
(*Correction*) 399

Ganging Superheterodyne Receivers, Martin Wald 105
Glass-insulated Chokes (*Illustration*) 3
Glass Insulation, Flexible 3

Hardening of Steel, Power Oscillators for Surface, G. Babat and M. Losinsky .. 16
High Frequencies, The Behaviour of Resistors at (*Editorial*) 471

I.E.E.—Eckersley's Paper "Analysis of the Effect of Scattering in Radio Transmission" 111
I.E.E. Meetings Resumed 64, 111
I.E.E. Meetings Suspended 488
I.E.E.—Walmsley's Paper "Wire Broadcasting Investigations at Audio and Carrier Frequencies" 160
I.E.E. Wireless Section Committee for 1940–41 302
Impedance and Admittance, Symbolic Representation of (*Editorial*) 1
Inductor with Air-Gapped Magnetic Circuit, The (*Editorial*) 145
(*Correspondence*) 297
INDUSTRY, THE:
Barimar's Welding Process 516
Edwards "Apiezon" and other Jointing Waxes, Greases and Cements for Vacuum Tubes 488
Ekco Change of Address 399
Ferris Signal Generators Type 18C and 40A 488
Londex Relays 516
Manganin Wire Type "Manganamron" Marketed by Scott Insulated Wire Co. .. 165
Marconi-Ekco Beat Frequency Oscillator Type TF602 165
Marconi-Ekco Change of Address 256
Marconi-Ekco Signal Generator Type TF517A 256
Marconi-Ekco U.H.F. Wavemeter Type TF643 256
Marconi-Osram Valves Type X14, Z14, HD14, N14, KT35, GU50 165
Multicore Solders, Reference Sheet No. 1 of their Products 488
Scott Insulated Wire Co. Market "Manganamron" Manganin Wire 256
Standard Telephones and Cables Blind-Approach Receiving Equipment Type KR1 399
Standard Telephones and Cables Short-Wave Transmitters, Type H.S.1 and H.S.2 399
Standard Telephones and Cables Wavemeter, Type R.502 165
Watford Instruments (Paul D. Tyers) New Products 256
Wild Barfield Electric Furnaces, Change of Address 399
Input Capacitance of a Triode Oscillator, J. van Slooten 13
Input Conductance: Measurement in High-Slope H.F. Amplifier Valves, F. Preisach and I. Zakariás 147
Institute of Physics: Extended Facilities of Panel of Consultants 399
Institution of Electronics: Hartree's Paper "Wave Mechanics" 160
Instruments, The Naming of (*Editorial*) .. 295
Interference Suppression by Means of Amplitude Limiters, Martin Wald 432
Interference Suppression: Revised B.S. Specifications 393
Inverters, The Performance of Commutator, L. C. Stenning 517

Long-Distance Broadcasting: Sir Noel Ashbridge's Paper at the Royal Institution 109
Losses in Radio Circuits, Dielectric, A. G. Bogle 198

Magnetic Circuit, The Inductor with Air-Gapped (*Editorial*) 145
(*Correspondence*) 297
Magneto Striction Oscillators, D. C. Stenning 158
Measuring High Resistances at Radio Frequencies, A New Method of (*Editorial*) .. 245
Modulation, Amplitude, Frequency and Phase (*Editorial*) 197, 339
(*Correspondence*) 353, 441, 477, 526
(*Correction*) 399
Modulation by Phase Shifting the Side Bands of an Amplitude Modulated Wave, Frequency, D. I. Lawson 388
Modulation, Velocity, R. Kompfner 478
Moving-Iron Voltmeters, Frequency Compensation of (*Editorial*) 429

N.P.L. Department of Light Formed: Smith Appointed Superintendent .. 256
N.P.L.—Spilsbury Succeeds Rayner as Superintendent of the Electricity Department 256
Naming of Instruments, The (*Editorial*) .. 295
Neutralising Screened Grid Valves, V. O. Stokes 354
New Method of Measuring High Resistances at Radio Frequencies (*Editorial*) 245
Noise Suppression by Means of Amplitude Limiters, Martin Wald 432
Nomenclature of Instruments (*Editorial*) .. 295
Non-Linear Circuits: Graphical Determination of Performance, J. Frommer and A. Rédl 4
(*Correction*) 60

Oscillator, Input Capacitance of a Triode, J. van Slooten 13
Oscillators, Magneto Striction, D. C. Stenning 158
Oscillators, Power: Circuit for Surface Hardening of Steel, G. Babat and M. Losinsky .. 16
Oscillographs, Battery-Operated Power Unit for Cathode-Ray, R. E. Burgess 296

PAGE

Parameters of Variable Air Condensers, Determination of Residual, R. Faraday Proctor 257
Performance of Commutator Inverters, The, L. C. Stenning 517
Phase Adjuster with Constant Amplitude, Continuously Variable, K. Kreielsheimer 439
Phase Convention of Currents and Voltages in Valve Circuits (*Editorial*) 95
(*Correspondence*) 165
Phase Focusing in Velocity-Modulated Beams, W. E. Benham 514
Phase, Frequency and Amplitude Modulation (*Editorial*) 197, 339
(*Correspondence*) 353, 441, 477, 526
(*Correction*) 399
Physics of the Divining Rod, The (*Editorial*) .. 51
Power Oscillators: Circuit for Surface Hardening of Steel, G. Babat and M. Losinsky 16
Power Unit for Cathode-Ray Oscillographs, Battery-Operated, R. E. Burgess .. 296

Quartz Crystal Vibrators and Electro-Acoustic Reactions, A. T. Starr 247, 303

R.A.F. Expansion and Radio Mechanics .. 109
R.M.A. Colour Code for Resistances and Fixed Condensers, New 399
Regenerative Circuits, The Stability of, R. S. Rivlin 298
Residual Parameters of Variable Air Condensers, Determination of, R. Faraday Proctor 257
Resistance Networks, Design Tables of, C. D. Colchester and M. W. Gough 206
Resistances at Radio Frequencies, A New Method of Measuring High (*Editorial*) .. 245
Resistors at High Frequencies, The Behaviour of (*Editorial*) 471
Royal Institution: Sir Noel Ashbridge's Paper on Long Distance Broadcasting .. 109

Scientific Advisory Committee to the Government 477
Screened Grid Valves, Neutralising, V. O. Stokes 354
Screening Cans: Effect on Coil Inductance and Resistance (*Editorial*) 511
Single-Valve Time-Base Circuit for Saw-Tooth or Rectangular Waveforms, B. C. Fleming-Williams 161
Stability of Regenerative Circuits, The, R. S. Rivlin 298
Steel-Hardening Circuit, Power Oscillators for, G. Babat and M. Losinsky 16
Superheterodyne Receivers, Ganging, Martin Wald 105
Surface Hardening of Steel, Power Oscillators for, G. Babat and M. Losinsky 16
Surface, Wireless Waves at the Earth's (*Editorial*) 385
Symbolic Representation of Impedance and Admittance (*Editorial*) 1

Television Relay System: Successful American Experiments 157
Time-Base Circuit for Saw-Tooth or Rectangular Wave-forms, B. C. Fleming-Williams 161
Trapezium Distortion in Cathode-Ray Tubes, B. C. Fleming-Williams 61
Triode Oscillator, Input Capacitance of a, J. van Slooten 13
"Tuning Rate," Band Spreading and its Effect on, F. H. Woodbridge 394
Two-Way Radio-Telephony: A New "Two-Wire Four-Wire" Control Terminal, Matei G. Marinesco 97
(*Correspondence*) 164

Valve Circuit Conventions (*Editorial*) .. 95
(*Correspondence*) 165
Valves, Neutralising Screened Grid, V. O. Stokes 354
Variable Air Condensers: Determination of their Residual Parameters, R. Faraday Proctor 257
Velocity-Modulated Beams, Electron Density Distribution in, D. Martineau Tombs .. 54
(*Correspondence*) 110, 202, 262
Velocity-Modulated Beams, Phase Focusing in, W. E. Benham 514
Velocity Modulation, R. Kompfner 478
Voltmeters, Frequency Compensation of Moving-Iron (*Editorial*) 429

Waves at the Earth's Surface, Wireless (*Editorial*) 385
Wire Broadcasting Experiments: I.E.E. Paper by T. Walmsley of the G.P.O. .. 160
Wireless Waves at the Earth's Surface (*Editorial*) 385

INDEX TO AUTHORS

PAGE

Babat, G. and Losinsky, M. 16
Benham, W. E. 514
Bogle, A. G. 198
Burgess, R. E. 296
Colchester, C. D. and Gough, M. W. .. 206
Fleming-Williams, B. C. 61, 161
Frommer, J. and Rédl, A. 4
Gough, M. W. and Colchester, C. D. .. 206
Kompfner, R. 478
Kreielsheimer, K. 439
Lawson, D. I. 388
Losinsky, M. and Babat, G. 16
Marinesco, Matei G. 97
Preisach, F. and Zakariás, I. 147
Proctor, R. Faraday 257
Rédl, A. and Frommer, J. 4
Rivlin, R. S. 298
Sandeman, E. K. 342
van Slooten, J. 13
Starr, A. T. 247, 303
Stenning, D. C. 158
Stenning, L. C. 517
Stokes, V. O. 354
Tombs, D. Martineau 54
Wald, Martin 105, 432
Woodbridge, F. H. 394
Zakariás, I. and Preisach, F. 147

THE WIRELESS ENGINEER

INDEX TO ABSTRACTS AND REFERENCES, 1940

PROPAGATION OF WAVES

Application of **Abelian** Finite Group Theory to Electromagnetic Refraction.—Whiteman, **1307.**

Absorption.—Bajpai & Mathur, **2869** (in Earth's Atmosphere : see also Mathur) ; Hoag, **10** (in Water) ; Mathur, **2868** (and Reflection : Oblique & Vertical Incidence) ; Mitra, Ray, & Ghosh, **3296** (Region F, and Atomic Oxygen for Elastic Collision with Electrons) ; Morita, **3283** (by Water-Shell) ; Shchukin, **2141** (Confirmation of Absorbing D Layer) ; Vassy, **473** (Researches on Atmospheric A.) ; White & Straker, **18** (Diurnal Variation of A. of W. Waves). See also Arc, Attenuation, Dispersion, Fade-Out, Hydrogen, Infra-Red, Ionospheric, Lines, Nitrogen, N.-Protoxide, Rocks, Skin-Effect, Sodium, Ultra-Short, Ultra-Violet, Woods-and-Underbrush.

Abnormal E : see F-Layer.

Aeroplane : see Dellinger.

New **Afterglow** Phenomenon.—Kaplan, **2900.**

Predictions of Useful Distances for **Amateur** Communication.—Smith & Kirby, **4199.**

Continuous Spectrum of Carbon **Arc.**—Maecker, **917.**

Atmosphere : see Diffusion, Harmonic, Pressure-Waves, Propagation, Searchlight, Transparency.

Atmospherics and Radio Transmission Phenomena in Puerto Rico [1935/1939].—Kenrick & Sammon, **464.**

Wave-Form of **Atmospherics** at Night.—Elder, Schonland, **2912.**

Wave Form, Energy, and Reflection by Ionosphere of **Atmospherics.**—Laby, **2138.**

Attenuation of High Frequencies over Land at Short Ranges [up to 10 Miles].—Hessel, **9.**

Attenuation : see also Line.

Aurora.—Bartels, **2899** (of 24/25 Feb. 1939 in Germany, and Geomagnetic Disturbances in Niemegk) ; Barton, **4204** (A. in a Test Tube) ; Beckmann, Menzel, & Vilbig, **1313** (Spreading of A. Disturbance & Resulting Latitude Effect) ; Bonnal, Maurain, **474** (of 13 Oct. 1939) ; Clayton, **2159** (and Sunspots) ; Dixon, **1760** (27.3-Day Period) ; Harang, Leithäuser, **2161** (Variation of Lower Boundary at Transition from Dark to Sun-Lit Atmosphere) ; Rowland, **2516** (and Magnetic Storm of March 24/25 & 29/30) ; Snoddy, **2898** (Determination of Intensity) ; Störmer, **1761** (in Southern Norway, 1938) ; Vegard, **2160** (Variations in Spectrum) ; White & Geddes, **919** (Antarctic Zone of Max. Frequency). See also Hydrogen, Nitrogen, Oxygen, Sodium, Solar.

Australian Radio Research Board : 11th Annual Report, **911.**

" The Mathematical Theory of Huygens' Principle " [**Book Review**].—Baker & Copson, **2907.**

" Cosmic Rays " [**Book Review**].—Millikan, **2875.**

Selective Fading in **Broadcast** Reception.—Alsleben : Feldtkeller & Mayer, **926.**

Variation in Intensity of Radio Signals [from Near-By **Broadcasting** Stations].—Colwell, **3730.**

Long-Distance **Broadcasting.**—Ashbridge, **2902.**

Calculation of Night Field Strength of Radio **Broadcasting** Stations.—Gulyaev, **2507.**

Ultra-Short Waves in Concentric **Cables,** and " Hollow-Space " Resonators in Form of a Cylinder with Perforated-Disc Ends.—Buchholz, **1301.**

Concentric **Cables** with Longitudinally Stratified Dielectric as Band-Stop Filters in m Wave Range and Below.—Buchholz, **1302.**

Cage : see Screening.

Cauchy-Dirichlet : see Diffraction (Mindlin).

Fundamental Electrical Oscillation of Cylindrical **Cavities.**—Borgnis. **905.**

Height of Mother-of-Pearl **Clouds.**—Störmer, **1320** & **1762.**

Coherence Problems [Visibility of Interference : etc.].—van Cittert, **931.**

Styctographic **Coherers.**—Penner, **461.**

Conductivity : see Dielectric-Constant, Ground.

Study of the Sun [and Its **Corona**].—Stokley, **3735.**

Rotation of Solar **Corona** as determined from Apparent Displacements in Its Structure, *and* Inner **Corona** on June 19th 1936.—Vsesviatsky & Bugoslavskaja, **3313.**

Green **Corona** Line 5303 A.U. [Connection between Regions of Intense Line-Emission and Magnetic Disturbances : etc.].—Waldmeier, **2167.**

Corona : see also Coronaviser, Light.

Coronaviser, Instrument for Observing Solar Corona in Full Sunlight.—Skellett, **30, 1758, 2896,** & **4202.**

New Type of Variation in **Cosmic Radiation.**—Alfvén, **3740.**

Time-Variations in **Cosmic-Ray** Intensity at High Altitudes, *and* Fine Structure in Directional Intensity of **Cosmic Rays.**—Jesse : Cooper, **4206.**

Cosmic Ray Intensities in Relation to Cyclones and Anticyclones.—Nishina & others, **3314.**

Cosmic Rays give Hint on Upper-Air Weather, **3315.**

Magnetic-Storm Effect on **Cosmic Rays,** *and* Air-Mass Effect on **Cosmic-Ray** Intensity.—Loughridge & Gast, **2874** & **3741.**

Maximum Energy which Primary Electrons of **Cosmic Rays** can have on Earth's Surface due to Radiation in Earth's Magnetic Field.—Pomeranchuk, **2873.**

Cosmic Rays : see also Book-Review, Ionisation-Loss, Magnetic, Mesotrons, Solar, and under " Atmospherics & Atmospheric Electricity."

C-Region : see Lower-Ionosphere, Scattering.

Critical Ionospheric **Frequencies** observed in Rome from Dec. 1938 to Sept. 1939.—Ranzi, **466.**

Critical Frequencies : see also Eclipses, F_2-Region, Ionosphere, Sky-Wave.

Aeronautical Radio Communication during **Dellinger Effect.**—Umeda, Otani, **922** & **3306.**

Dellinger Effect : see also Fade-Out, Magnetic.

Deviations of Short Radio Waves from London/New York Great-Circle Path.—Feldman, **12.**

Dielectric Constant of Space Containing Electrons.—Khastgir & Sirajuddin, **456.**

Dielectric Constant of Ionised Air, *and* **Dielectric Constant** and Electrical Conductivity of Gases and Vapours Ionised by X-Rays, at Ultra-High Radio Frequency.—Khastgir & Rahman, **2876** & **2877.**

Dielectric Constant of Water Vapour at Frequency of 42 Megacycles [Connection with Transmission of Radio Signals through Atmosphere].—Tregidga, **458.**

Note on Solution of Some Partial **Differential Equations** in Finite Domain [Wave Equation of Vertical Propagation in Atmosphere, etc].—Howell, **33.**

Diffraction.—Coulomb, **2911** (of Perturbation near Caustic : Application to P′ Waves) ; Eckersley & Millington, **16** (Relation between Height & Gain) ; Haseltine, **2134** & **2522** (of Radio Ranges by Hills) ; Ignatowsky, **3333** (at Slit or Bar) ; Kontorowich & Lebedev, **492** (Solution of Some Problems by Inversion Formula) ; Lowan, **1767** (of Heat) ; McPetrie & Saxon, **4** (of Ultra-Short Waves) ; Mindlin, **3743** (of Plane Elastic Waves) ; Schelkunoff, **1** & **2** (D. & Radiation of Electromagnetic Waves) ; Sexl & Urban, **3** (Remark on Classical Theory). See also Films, Grating, Grids, Wave.

Diffuse Boundaries : see Reflections.

Note on Photometry of Large Sources : Rôle of **Diffusion** of Light by Suspended Corpuscles in Atmosphere.—Marsat, **2182.**

Radio **Direction-Finding** on Wavelengths between 2 and 3 Metres (100 to 150 Mc/s).—Smith-Rose & Hopkins, **4195.**

Dispersion of Wireless Echoes from Ionosphere.—White, **17.**

Dispersion and Absorption of Electric Waves in Alcohols and Aqueous Solutions.—Slevogt, **494.**

Anomalous **Dispersion** and Absorption of Electric Waves in Solutions of Amino-Acids and Dipeptides.—Bateman & Potapenko, **3284.**

Distance Measurements by Wireless, **3723.**

Cosmo-Physical **Disturbances** of Ionosphere, Troposphere, and Biosphere.—Düll & Düll, **2884.**

Quadratic **Doppler Effect.**—Otting, **2181.**

Doppler Effect from Moving Mirrors.—Ives, **3336.**

Earth : see Ground, Magnetic, Propagation, Velocity.

Possible Explanation of Deep-Focus **Earthquakes.**—Lynch, **3746.**

Wireless Waves at **Earth's Surface.**—G. W. O. H., **4192.**

Reflection Curves and Propagation Characteristics of Radio Waves along **Earth's Surface.**—McPetrie & Stickland, **4193.**

Earth's Surface : see also Skin-Effect.

Reception of Radio **Echoes** from Distant Ionospheric Irregularities [Variations in Curvature of F Layer : Wave Motion in Upper Atmosphere].—Pierce & Mimno, **2146.**

Echoes : see also Impulses, Ultra-Short.

Infra-Red Records of **Eclipse** made in Texas [and Report on E & F Layer Ionisation].—Berkner, **2885.**

E Region of Ionosphere during Annular Solar **Eclipse** of April 7th, 1940.—Hulburt, **921.**

Local Variation of Atmospheric Potential Gradient during Four Solar **Eclipses** at Taihoku.—Ogasahara, **4203.**

Predictions of Normal Radio Critical Frequencies related to Solar **Eclipses** in 1940.—Smith, **2169.**

Elastic : see Diffraction, Initial-Stress, Wave.

E-Layer : see Eclipse, F-Layer, Ionisation, Night-Sky, Scattering.

Electron Concentration and Temperature and Their Determination by Broadening of Spectral Lines due to Electron Collisions.—Schulz, **916.**

Propagation of Waves—

Note on Distribution of Velocities of Slow **Electrons** in Gases.—Reed, **2878.**
Mechanical Analogy to Motion of **Electrons** in Gases.—Yarnold, **1759.**
Electrons : see also Arc, Cosmic-Rays, F-Layer, Magnetic, Propagation, Recombination, Reflection.
Convex & Toroidal **Endovibrators.**—Neiman, **455, 1743,** & **1744.**
Exchange of **Energy** between Translation and Rotation by Collisions.—Haber, **19.**
Energy : see also Ionisation, Solar.
Propagation Phenomena in Long-Distance **Facsimile** Transmission by Sub-Carrier Frequency Modulation.—Mathes & Whitaker, **463.**
Note on Early **Fade-Out** Investigations.—Braaten, **923.**
Origin of Radio **Fade-Outs,** and Absorption Coefficient of Gases for Light of Wavelength 1215.7 AU.—Preston, **2888.**
Fade-Outs : see also Dellinger, Hydrogen, Ionosphere, Magnetic, Short-Wave, Solar, Sun, Sunspots.
Resultant Intensity of Number of Vibrations whose Phases are at Random [Study of **Fading**].—Nakagami & Ohno, **2883.**
Fading : see also Broadcast, Propagation (**4194**), Trains.
Calculation of Driving-Point Impedance in Electromagnetic **Field** Problems.—Stratton & Chu, **3325.**
High-Frequency Broadcast-Station **Field-Coverage** Survey [W8XNU (Cincinnati) on about 26 Mc/s].—Leydorf & others, **2132.**
Field-Strengths : see Broadcasting, Short, Solar, Ultra-Short.
Contribution to Optics of Very Thin Metallic **Films.**—Hacman, **493.**
Explanation of Anomalies of Optical Constants of Thin Metallic **Films.**—David, **930.**
Films : see also Fresnel.
Association of Meteorological Changes with Variations of Ionisation in F_2 **Region** of Ionosphere.—Bannon, Higgs, Martyn, & Munro, **2142.**
Existence of Biannual Component in F_2**-Layer** Ionisation.—Eckersley, **2143.**
Method of Plotting Electron Distribution Curves for **F Layer.**—McLeish, **2880.**
Influence of Geomagnetic Activity on Height and Concentration of **F Layer,** and Connection between Abnormal E Ionisation and Disturbances of F Layer.—Netzer, **2508.**
Non-Seasonal Behaviour of **F Region.**—Seaton & Berkner, **1753.**
Measurements of F_2**-Region** Ionisation over New Zealand.—White Banwell, & Peddie, **2144.**
F-Layer : see also Absorption, Echoes, Eclipse, G-Layer, Magnetic, Recombination, Sky-Wave.
Transmission [**Fluctuations**] on 41 Megacycles.—Mackeown, Oliver, & Tregidga, **457.**
Fresnel Formulae applied to Phenomena of Non-Reflecting Films.—Blodgett, **2908.**
Table of **Fresnel** Reflection [applicable to Many Problems, including Scattering of Light by Fog].—Moon, **1306.**
Fresnel : see also Reflections.
Influence of Radio-**Geological** Properties of Subsoil on Propagation of Electromagnetic Waves.—Fritsch, **1324.**
Geomagnetic : see Magnetic.
"G-Layer" [Tomsk Ionosphere Station repeatedly observes Existence of Reflecting Layer above F_2 Layer].—Likhachev, **3301.**
Generalised Theory of Concave **Grating.**—Beutler, **3332.**
Dark Bands in Spectra of Double Diffraction **Gratings.**—Houston, **4208.**
Passage of Electric Waves through Wire **Grids.**—Wessel, **5.**
Radio-Frequency Measurements of **Ground Conductivity** in Canada.—MacKinnon, **3742.**
Ground Wave Propagation Characteristics.—Smith, **2523.**
Demonstration of **Guided Waves.**—Southworth & others, **2128.**
Significance-Test for Ellipticity in **Harmonic Dial.**—Mauchly, **3319.**
Relation between Actual and Virtual Ionospheric **Height.**—Booker & Seaton, **2145.**
Height-&-Gain : see Diffraction.
Hills : see Diffraction.
Movement of Electromagnetic Waves in Conical **Horn.**—Buchholz, **2862.**
Horns : see also Wave-Guides.
Absorption of **Hydrogen** Line 1215.7 AU by Air.—Preston, **2519.**
Absorption of **Hydrogen** Lyman Radiation by Atmospheric Gases.—Williams, **1317.**
Hydrogen Showers in Auroral Region.—Vegard, **918.**
Hydrogen : see also Auroral.
Hyperfrequency Waves and Their Practical Use.—Brillouin, **3278.**
Generation of Rectangular **Impulses.**—Miyoshi, **470.**
Impulses : see also Pulses.
Pressure Effect on **Infra-Red** Absorption [and New Method of determining height of Ozone].—Strong & Watanabe, **3299.**
Infra-Red : see also Sun, and under "Miscellaneous."
Influence of **Initial Stress** on Elastic Waves.—Biot, **4209.**
Pathological Case in Numerical Solution of **Integral Equations.**—Pekeris, **4210.**
Interference between Television Signals from Philco and C.B.S. Stations, separated by 90 Miles, **3722.**
Possibility of Observation of Luminous **Interference** arising from Two Different Sources.—Esclangon, **502.**
Haidinger's Rings in Non-Uniform Plates [**Interference** Figure].—Raman & Rajagopalan, **3335.**
Interreflections [of Radiant Energy].—Moon, **2909.**
Normal and Abnormal Region-E **Ionisation** [through the Sunspot Cycle].—Appleton & Naismith, **3289.**
Vertical Distribution of **Ionisation** in Upper Atmosphere.—Pekeris, **3291.**
Ionisation in Upper Atmosphere.—Saha & Rai, **1754.**
Ionisation Loss of Energy [of a Fast Charged Particle] in Gases and in Condensed Materials.—Fermi, **2137.**
Ionosphere, Ionospheric.—Appleton & Beynon, **3290** (Application of Data to Radio-Communication Problems); Bhar, **2147** (at Calcutta); Darrow, **3729** (Survey); Gilliland & others, **25, 465,** & **3304** (at Washington); Kossikov, **1752** (Minimum Working Wavelengths); Lejay, **2148** & **3302** (at Shanghai: Echo-Variations & Turbulence: Reflection Coefficients); Maeda, **908** (9–150 m Waves); Majorana, **1309** (Survey); Nat. Bur. Stds, **2512** (Survey); Nat. Phys. Lab., **2511** (Monthly Tables); Ranzi, **2905** (Apparatus at Rome); Schafer & Goodall, **14** (Simultaneous Observations); Stetson & others, **2904** (I.R.E.-U.R.S.I.); Wells, Harang, Parkinson & others, **912, 2150,** & **3303** (Huancayo, Tromsö, Watheroo); White, **2506** (Estimation of Transmission Data).
Ionosphere, Ionospheric.—See also Abelian, Absorption, Aurora, Critical, Dielectric-Constant, Dispersion, Disturbances, Echoes, Eclipse, Electron, F-Layer, -Region, G-Layer, Height, Ionisation, Lorentz, Lower-Ionosphere, Magnet(ic), Magnetograph, Marconi, Propagation, Recombination, Reflection, Sky-Wave, Solar, Storms, Sun, Upper-Atmosphere, Very-Long.
Light incident on Particles falling in Magnetic Field produces Motion along Lines of Force: Formation of Solar Corona, *and* **Light** under Certain Conditions exerts Attractive Force on Matter.—Ehrenhaft, **2175.**
Comprehensive Theory of **Light.**—Fireman, **3331.**
Is **Light** Slowing Down?—Mayer, **503.**
Light : see also Coherence, Diffraction, Diffusion, Doppler, Fade-Outs, Films, Fresnel, Infra-Red, Interference, Optical-Constants, Photon, Scattering, Searchlight, Transparency, Ultra-Violet, Velocity.
Input Impedance of H.F. Parallel-Wire Transmission **Lines** immersed in Absorbing Medium.—Banerjee, **3282.**
Propagation of H.F. Electromagnetic Energy along Symmetrical Multi-Conductor **Lines.**—Dyakov, **3745.**
Propagation of Electromagnetic Waves in Transmission **Lines** running within Rectangular Screens.—Feld, **928.**
Derivation of Formulae for Travelling Wave when Telemechanical Signals are transmitted over **Line.**—Kovalenkov, **3744.**
Theory of Resonance in Micro-Wave Transmission **Lines** with Discontinuous Dielectric [Lecher Wires: Wave Guides].—Lamont, **3281.**
Alternative Treatment of Attenuation of Waves in Coil-Loaded Telephone **Line.**—Metson, **3326.**
Lines : see also Cables, Networks, Slow-Motion, Velocity, Wires, and under "Properties of Circuits."
Propagation of Waves in **Liquid** possessing "Maxwell Viscosity."—Issakovich, **929.**
Papers on Behaviour of **Liquids** at Short-Wave and Micro-Wave Frequencies.—Schmale: Odenwald, **6.**
Ionospheric Investigation concerning **Lorentz** Polarisation Correction.—Booker & Berkner, **2503.**
Lorentz "Polarisation" Correction in Ionosphere.—Martyn & Munro, **14.**
Effect of **Lorentz** Polarisation Term in Ionospheric Calculations.—Ratcliffe, **15.**
Lorentz : see also Television.
Measurements of **Lower Ionosphere** [& Some Conclusions regarding C, C′, & D Regions].—Maeda, Kohno, & Ohmori, **909.**
Influence of **Lunar** Periodicity on Climate according to O. Pettersson.—Benedicks, **3736.**
Magnetic.—Great Magnetic Storm of Easter Sunday, 24th March, **2514, 2515, 2890, 2891,** & **2892** (Ellison & others); Principal M. Storms, **2156** & **3317**; Balakov & Dolukhanov, **22** (and Radio Communication on Short Waves); Berkner, Wells, & Seaton, **1757** (M. Disturbances & Ionospheric Effects); Harang, Leithäuser, **2152** (Pulsations at 650–800 km); Hirayama, **2887** (M. Changes & Dellinger Effect); Labrouste, **23** & **488** (11-Year Cycle of Semidiurnal Component); Nagaoka, **3300** (Six-Month Period and F_2 Layer); Rangaswami, **2153** (at Alibag); Wasserfall, **2154** (Character Numbers at Dombaas, & Sunspot Numbers); see also Aurora, Corona, Cosmic-Rays, F Layer, G Layer, Harmonic-Dial, Penetration, Propagation, Quantic-Emission, Solar, Sunspot, Ultra-Short, Velocity, and below.
Space Closure of Periodic Orbits in Field of **Magnetic Dipole** [Ring Theory of Magnetic Storms and Determination of Distribution of Cosmic Rays].—Godart, **3316.**
Motion of Electrified Corpuscle in Presence of **Magnetic Dipole.**—Manarini, **1312.**
Properties of Electron Gas in **Magnetic Field** [by Quantum Theory].—Achieser, **915.**
Physical Representation of Geo-**magnetic Field.**—McNish, **3323.**

Propagation of Waves—

High-Frequency Conductivity of Ionised Medium in Presence of External Transverse **Magnetic Field**.—Singh & Sinha, **3288.**
Interior of Earth [and Earth's **Magnetic Field**].—Teller & Tuve, **3321.**
Origin of Terrestrial **Magnetism**.—Dauvillier, **1318.**
Summary of Year's Work, Department of Terrestrial **Magnetism**, Carnegie Institution.—Fleming, **913.**
Proposed Thermoelectric Origin of Earth's **Magnetism**.—Inglis & Teller: Elsasser, **2155** & **3322.**
Studies of Secular Variations of Terrestrial **Magnetism**.—Lazarev, **3318.**
Induction **Magnetograph** [Applicable to Ionospheric Research].—Nagaoka & Ikebe, **21.**
Wide-Range **Magnetograph** at Washington, D.C.—Fleming, **3320.**
Report on Activity of "G. **Marconi**" Radioelectric Centre during 1938.—Bottini, **1310.**
Intensity and Rate of Production of **Mesotrons** in Stratosphere.—Schein & others, **2872.**
Production of Atomic **Metastable** States by Photoionisation and Recombination, *and* Photoionisation and Recombination of O Atoms.—Yamanouchi, Kotani, **3295.**
Researches on Physical Theory of **Meteor** Phenomena.—Opik, **2140.**
Elements of Physical Theory of **Meteors**.—Levin, **3305.**
Telescopic **Meteors,** *and* Seasonal Variation in Height of **Meteors**.—Watson: McIntosh, **3739.**
Meteors.—See also Temperatures.
Electromagnetic Waves and **Meteorological** Phenomena.—Basili, **1322.**
Developments in **Meteorological** Sounding by Radio Waves.—Friend, **3728.**
Meteorological : see also Cosmic-Rays, F_2-Region, Weather.
Micro-Waves : see Lines, Ultra-High, Wave-Guide.
Measurements of Wave Propagation in Some Austrian **Mines**.—Fritsch, **1765.**
Propagation of Oscillations of H.F. Transmission along Electric Power **Networks**.—Carbenay, **498.**
Night-Sky.—Bradbury & Sumerlin, **2163** (and Nocturnal E-Layer Ionisation); Cabannes & Aynard, **32** & **475** (Nitrogen Excitation); Cario & Stille, **31** (Sodium D Lines); Frongia, **1316** (Survey); Garrigue, **478** (Absolute Brilliance); Hoffmeister, **2168** (and Zodiacal Light); Kaplan, **2164** (Levels of Emission of Spectra); Tönsberg & Vegard, **2165** & **2520** (Origin of Yellow Line in Twilight: Night-Sky Luminescence—Sodium).
Nitrogen.—Bernard, Fouillouze, **477** & **3297** (Excitation of Band Systems); Jenkins & Worley, **2518** (Extreme Ultra-Violet Absorption); Kaplan & Rubens, **3737** (Afterglow); Kaplan, **476** (Forbidden Transitions); Rayleigh, **4205** (New Studies); Rypdal & Vegard, **3298** (and Bearing on Auroral Problems); see also Afterglow, Metastable, & Nitrogen-Protoxide.
Photometric Study of Ultra-Violet Absorption Spectrum of Gaseous **Nitrogen Protoxide** between + 20°C and − 90°C.—Nicolle & Vodar, **1315.**
North-Atlantic Anomaly : see Storms.
Application of New Photoelectric Method to Determination of **Optical Constants** of Some Pure Metals *and* **Optical Constants** of Copper/Nickel Alloys.—Bor, Hobson, & Wood, **1328.**
Excitation of Green Auroral Line of **Oxygen**.—Emeleus, Sloane, & Cathcart, **1314.**
Oxygen : see also Absorption, Metastable.
Ozone "Clouds" [Hour-to-Hour Fluctuations of Ozone Density].—Götz, **2139.**
Ozone in the '38 Hurricane.—Peters, **481.**
Additional Remarks on Articles "Researches on Atmospheric **Ozone**."—Vassy: Barbier & Chalonge, **480.**
New Radiation Pyrometer [for **Ozone** Temperatures].—Strong, **920.**
Ozone : see also Infra-Red.
Notes and Abacs on **Penetration** of Medium-Frequency [5 kc/s] Waves in Ferromagnetic Materials.—van Lancker: Ribaud, **1327.**
Permeability of Iron and Nickel for Hertzian Oscillations [Wavelengths to 16 cm]—Lindman, **2130.**
Phases : see Fading.
Photoionisation : see Metastable.
Momentum of **Photon** inside Medium [and Corpuscular Aspect of Light Propagation].—Kothara, **1766.**
Damped Electromagnetic Waves in Hollow Metal **Pipes**.—Melloh, **2861.**
Radiation from **Point Charge** revolving in Circular Orbit [Work related to "Rotating Electromagnetic Waves"].—Poritsky, **2176.**
Electromagnetic Radiation from **Point Sources**.—Fradin, **1748.**
Polarisation : see Dispersion, Earth's Surface, Lorentz, Propagation, Ultra-Short.
Pressure : see Infra-Red, Temperature.
Pressure Waves and Boundary Surfaces in Free Atmosphere ["Canal Wave" Theory].—Subrahmanyam, **2505.**
New Apparatus for Representation and Investigation of **Progressive Waves** along Flexible Carrier.—Bruns, **2910.**
Research Work on **Propagation** of Waves [including Ultra-Short] by German P.O., **2133.**
Radio Progress during 1939: Wave **Propagation, 2903.**
Symmetrical Electromagnetic **Propagation** in Relation to an Axis—Agostinelli, **1311.**
Report of Commission II, Radio Wave **Propagation,** International Scientific Radio Union.—Dellinger, **20.**
Propagation of Waves sent out by Vertical Transmitter in Atmosphere whose Dielectric Constant and Conductivity depend on Height.—Grünberg, **3726.**
Free Space **Propagation** Measurements at 75 Megacycles.—Haller, **2131.**
Propagation of Electromagnetic Waves in Atmosphere containing Free Electrons.—Huxley, **2879.**
Some Measurements of 540-Kilocycle **Propagation** over High-Conductivity Prairie Provinces.—MacKinnon, **2906.**
Experimental Investigation of **Propagation** of Radiation having Wavelengths of 2 and 3 Metres.—McPetrie & Saxton, **4194.**
Propagation of Radio Waves over Spherical Earth: Experimental Data and Empirical Formulae.—Pierucci, **2135.**
Propagation of Wireless Waves round the Earth [No Sharp Cut-Off Effect at Horizon except for Wavelengths round 1 cm: etc.].—van der Pol & Bremmer, **907.**
Propagation : see also Absorption, Amateur, Attenuation, Deviations, Differential, Earth's-Surface, Facsimile, Geological, Ground-Wave, Ionosphere, Lines, Liquid, Meteorological, Mines, Networks, Progressive-Waves, Range, Reciprocity, Shock, Surface, Ultra-, Velocity, Viscous, Water, Waves, Wave-Guide.
Single and Double **Pulse** Generator.—Roberts, **13.**
Pulses : see also Impulses, Scattering, Square-Wave.
Quantic Emission in Phase in Region of Radioelectric Waves.—Jonescu, **2502.**
Sun and Sky **Radiation** on Jungfraujoch during International Polar Year 1932/33.—Chorus, **2521.**
Measurement of **Radiation** of Sky.—Heck, **479.**
General **Radiation** Formula [for Power radiated in Non-Dissipative Media].—Schelkunoff, **11** & **3724.**
Radiation : see also Point-Sources, Ultra-Violet.
Ranges : see Amateur, Ionosphere, Sky-Wave.
Wireless Propagation and **Reciprocity** Law.—Eckersley, Falloon, Farmer, & Agar, **1749.**
Reciprocity and Generalised Concept of Transducer in Radio Links.—Latmiral, **1308.**
Preferential and Initial Ionic **Recombination** in Gases.—Bradbury, **468** & **2510.**
Recombination and Electron Attachment in F_2 Layer of Ionosphere.—Mohler, **3293.**
Ionic **Recombination** in Gases.—Sayers, **2136.**
Rigorous Theory of **Recombination** of Both Small and Large Ions in Gases at High Pressures.—Harper, **3294.**
Recombination : see also Metastable, and under "Atmospherics & Atmospheric Electricity."
Heights of **Reflection** of Radio Waves in Rome from Jan. to Sept. 1939.—Bolle, **467.**
Measurements of **Reflection**-Coefficient as Function of Frequency, for determining Vertical Distribution of Electron-Collision Frequency.—Pekeris, **3292.**
Wave **Reflections** from Diffuse Boundaries, *and* Wave **Reflections** at Oblique Incidence.—Thomas & Colwell, **1305** & **3725.**
Reflection : see also Absorption, Atmospherics, Earth's-Surface, Fresnel, Interreflections, Ionosphere, Line, Rocks, Troposphere, Very-Long.
"Formeln und Tabellen zur Berechnung der nivellitischen Refraktion" [in Surveying: **Refraction** by Air near Ground: Book Review].—Kukkamäki, **1763.**
Refraction : see also Abelian, Rocks, Waves.
Reflection, Refraction, and Absorption Characteristics of Electromagnetic Waves on **Rocks**.—Kodawaki, **4196.**
Rotating Waves : see Point-Charge.
Radiation Climate in **Scandinavian** Peninsula.—Aurén, **29.**
Analysis of Effect of **Scattering** in Radio Transmission.—Eckersley, **1304, 1750,** & **2881.**
Scattering of Radio Waves in Lower and Middle Atmosphere.—Piddington, **1303.**
Note on "Theory of Light-**Scattering**" [by Particles in Suspension in Liquids, etc.].—Parthasarathy: Krishnan, **3334.**
Scattering : see also Diffraction, Fresnel, Searchlight.
Disturbance Field of High-Tension Discharge in **Screened** Room.—Klăy, **491.**
Screening Effect of Wire Cages.—Kontorovich, **3324.**
Measurement of Light scattered by Upper Atmosphere from **Searchlight** Beam.—Johnson, Meyer, **471** & **910.**
New Kind of **Seismic** Wave [Fifth Fundamental Type, driving Particles diagonally to Path].—Leet, **34.**
New Type of **Seismic** Wave of Longitudinal Type between the P and S Phases.—Rosini, **35.**
Seismic Waves : see also Diffraction, Integral.
Classical Theory of **Shock** and Theory of Propagated Discontinuity.—Thompson, **3328.**
Collecting **Short-Wave** Data: Long Period Observations of Propagation Conditions.—Heightman, **3727.**
Variations in Transit Time of Wireless Signals on **Short Wave.**—Mivadi, **3286.**
Bearing of Recent Ionospheric Studies on Commercial **Short-Wave** Communication.—Ohno, **2151.**

Propagation of Waves—

Method for Calculating Field Strength on **Short Waves** at Shorter Distances.—Shchukina, **1751.**

Short Waves : see also Absorption, Dellinger, Deviations, Field-Coverage, G-Layer, Magnetic, Reciprocity.

Calculation of **Skin-Effect** by Method of Perturbations.—Rytov, **4191.**

Skin Effect : see also Earth's-Surface.

Sky : see Night-Sky, Radiation.

Calculation of Radio **Sky-Wave** Transmission.—Maeda & Kohno, **4197.**

Electrical Wave Shown in **Slow Motion** [by Mechanical Model of Transmission Line].—Wagner : Westinghouse, **1325.**

Luminous Discharge in Gas in Presence of Sodium Chloride : Remarks on Origin of Atmospheric **Sodium.**—Déjardin & Falgon, **2901.**

Absorption of Yellow Twilight Ray by **Sodium** Vapour.—Kastler, **2166.**

Atmospheric Layer from which originates Yellow Line in Twilight [due to Extra-Terrestrial **Sodium**].—Vegard, **2520.**

Sodium : see also Night-Sky.

Soil : see Geological, Ground.

Solar.—See Corona, Coronaviser, Eclipse, Magnetic, Radiation Scandinavian, Sun, Sunspots, Ultra-Violet, Weather, & below.

Solar Activity.—Abetti, **925** (and Cosmic Rays, Terrestrial Magnetism) ; Dieminger & Plendl (see Scultetus) ; Lisman, **1755** (and Radio Reception in 1938) ; Newton & Narayan, **3308** (and Magnetic Storms) ; Salaruddin & Narayan, **2517** (Unusual, with No Corresponding Magnetic Disturbances) ; Scultetus, **2889** (in Sunspot-Maximum Year) ; Stetson, **487** (and Associated Phenomena), & **2162** (Auroras, Radio Field-Strengths).

Solar and Terrestrial Relationships.—Appleton & others, **485.**

Papers on Possible Changes in **Solar "Constant,"** and Relation to Weather.—Abbot, Arctowski, Hulme, Priston, Sterne, **28, 482, 1321, 2893, 3311, 3733, 4200,** & **4201.**

Solar Cycle and F_2 Region of Ionosphere.—Goodall, **24** & **486.**

Association of Radio Fade-Outs with **Solar Eruptions.**—Giovanelli & Higgs, **924** & **2897.**

Geiger-Counter Measurements in Upper Atmosphere bearing upon Nature of Radiation from **Solar Flares** and Radio Fade-Outs.—Johnson & Korff, **2513.**

Law of **Solar Rotation.**—de Lury, **2170.**

Curve of Energy of **Solar Spectrum.**—Chalonge & Déjardin, **2173.**

Problem of **Sphere** placed in Homogeneous Alternating Magnetic or Electric Field.—Divil'kovski, **462.**

Sphere : see also Diffraction.

Generation of **Square-Wave** Voltage, at High Frequencies.—Fenn, **469.**

Ionosphere **Storms** and Radio Transmission between North America and Europe.—Dellinger & Cosentino, **4198.**

Stratosphere : see Mesotrons, Temperature.

Spots on **Sun** [and Correlation with Earth Currents & Radio Disturbances : Bell Laboratories' Ground-Potential Records, etc.].—Durkee, **3307.**

Sun and Ionosphere : I—Sun as Cause of Normal Ionisation of Ionosphere : II—Sun as Cause of Ionospheric Disturbances.—Grotrian, **26.**

Localisation of Centres of Geoactive Radiation in **Sun's** Active Regions.—Rubashev, **3310.**

Radio and **Sun**-Caused Disturbances.—Stetson, **2886.**

Composition of **Sun** [Opportunity of measuring Infra-Red Radiation from Limb].—Struve, **2174.**

Fine Structure of **Sun's** Surface, *and* Solar Eruptions.—Waldmeier : Giovanelli, **2897.**

Sunspots.—Recent Large Ss, 27 **489, 1319,** & **2172 ;** Arctowski, Abbot, **2893** (Heat & Light Fluctuations correspond with Areas : see also Solar Constant) ; Brunner, **1758** & **2171** (Numbers, Prominence Areas) ; Eigenson, **3309** (Stability) ; Jackson, **2157** (and Agincourt Magnetic Data) ; Johnson, **2895** (Relation to Precipitation, etc.) ; Newton, **2158** (and Eruptions, Magnetic Storms) ; Salaruddin & Subramanyam, **3732** (and Magnetic Storms) ; Seshachar & Iyer, **490** (and Mysore Rainfall) ; Sterne & others, **3733** (Solar-Radiation Cycles : see also Solar-Constant). See also Aurora, F_2 Layer, Ionisation, Magnetic, Solar, Weather.

Does a **Surface** Wave exist ? a Question of Nomenclature.—David, **1323.** See also Earth's Surface.

Linear Extension of Reflected Image produced by **Surface** traversed by Waves [Sheet of Disturbed Water].—Auluck, **2183.**

Transatlantic Reception of London **Television** Signals.—Goddard, **459.**

Pressure and **Temperature** Variations in Free Atmosphere over Boston, *and* Distribution of **Temperature** in Lower Stratosphere.—Haurwitz : Chiplonkar, **2871.**

Compensation by Vertical Movement or by Advection ? [**Temperature** & Pressure in Troposphere.—Ertel, **2870.**

Stratosphere **Temperatures** by New Type of "Meteor Speedometer."—Whipple, **8.**

Fading of Received Signals produced by Moving Railway-**Trains.**—Oxenfart, **927.**

Transit Time : see Short-Wave.

Transparency of Atmosphere.—Duclaux, **472** & **1764.**

Wave Configurations of **Travelling Electromagnetic Fields** produced in Long Hollow Cylinder.—Iwakata, **3280.**

Heights of Reflecting Regions in **Troposphere.**—Friend & Colwell, **7.**

Radio Wave Reflections in **Troposphere.**—Stoodley, **2867.**

Troposphere : see also Disturbances, Sun's, Temperature, Ultra-Short.

Attenuation of Electromagnetic Waves in **Tubes.**—Rytov, **2860.**

Propagation of Electromagnetic Waves inside a Cylindrical Metal **Tube** and along Other Types of Guide.—Hsü Chang Pen, **3718.**

Two-Way Telephonic Communication over 90 Miles with **Ultra-Short** Waves [1.3 m], **3721.**

Note on Diurnal Variation of **Ultra-Short-**Wave "Optical-Path" Transmission.—Englund, Crawford, & Mumford, **2864.**

Ultra-High-Frequency Propagation Characteristics [35.6 Mc/s Survey from Urban Area, radiating over Hilly Country].—Hamburger, Larrick, & Jones, **2865.**

Echo Investigation on **Ultra-Short** Waves.—Harang & Stoffregen, **2866.**

Ultra-High-Frequency Propagation Formulas.—Peterson, **460.**

Mobile Field-Strength Recordings of 49.5, 83.5, and 142 Mc/s **Ultra-Short** Waves : Horizontal and Vertical Polarisation.—Wickizer, **3285.**

Ultra-High, -Short : see also Attenuation, Cables, Coherers, Dielectric-Constant, Diffraction, Direction-Finding, Dispersion, Endovibrator, Fluctuations, Grids, Hyperfrequency, Interference, Ionosphere, Lines, Liquids, Lower-Ionosphere, Permeability, Propagation, Short, Troposphere, Wave-Guides, Water, Wires, Woods-&-Underbrush.

Computation of Transmission Factors of **Ultra-Violet** Radiation through Water, *and* Submarine Illumination in Photometric Units.—Benford : Utterback & Wilson, **2179.**

Measurements of **Ultra-Violet** Radiation from Sun in Stockholm.—Lindholm & Cronheim, **3734.**

Four-Year Record of **Ultra-Violet** Energy in Daylight.—Luckiesh, **483.**

Establishment of **Ultra-Violet** Solar Radiation at $\lambda = 2150$ A.U.—Meyer, **484.**

Energy in Solar **Ultra-Violet.**—Pettit, **3312.**

Estimate of Absorption of Air in Extreme **Ultra-Violet.**—Schneider, **2178.**

Ultra-Violet : see also Nitrogen.

Upper Atmosphere : see also Cosmic-Rays, Ionisation, Ionosphere, Searchlight.

Further Investigation of **Velocity** of Propagation of Light *in Vacuo* in Transverse Magnetic Field.—Banwell & Farr, **2180.**

Attempt to Measure **Velocity** of Signal.—Baurand, **501.**

Velocity of Propagation of Wireless Waves over Ground.—Farmer & Mohanty, **3287.**

Determination of **Velocity** of Light, using Kerr Effect and Photo-electric Cell.—Hüttel, **4207.**

Measurements of Propagation **Velocity** of Electromagnetic Waves along Two-Wire Circuit in Inhomogeneous Medium.—Malov, **906.**

Velocity of Propagation and Transient Phenomena along Smooth Lines and Pupinised Cables.—Possenti, **499** & **1326.**

Velocity of Propagation of Electrical Disturbances.—Ramo, **2504.**

Velocity : see also Light, Short-Wave.

Theory of Reflection of **Very Long** Wireless Waves from Ionosphere.—Wilkes, **2149** & **2509.**

Propagation of Motion in **Viscous** Materials.—Cagniard, **3329.**

Energy Distribution in Near Zone of Transmitting Dipoles under **Water,** with Use of Reflectors.—Pätzold & Osswald, **2863.**

Water : see also Absorption, Dielectric-Constant, Ultra-Violet.

Propagation Surface of Scalar **Waves** in a Medium resembling a Grid.—Fues, **497.**

Mathematical Theory of Irrotational Translation **Waves.**—Keulegan & Patterson, **1768.**

Diffraction of Disrupted Elastic **Wave** from Rectilinear Edge or Circular Orifice.—Kharkevich, **495.**

Filtration of Oblique Elastic **Waves** in Stratified Media.—Lindsay, **496.**

Propagation of **Waves** in Two Dimensions : *also* Solution of Cauchy-Dirichlet's External Problem for **Wave** Equation in Case of Circle : *and* Propagation of Elastic **Waves** in Two Dimensions.—Mindlin, **3330.**

Mechanical Demonstrator of Travelling **Waves.**—Wagner, **500.**

Inhomogeneous Plane **Waves** [Refraction on Passage from Transparent to Absorbing Medium].—Westerdijk, **2177.**

Waves : see also Point-Charge, Progressive, Surface.

Method for Solving **Wave Equation** in Region with Perturbed Boundaries.—Feshbach & Clogston, **3327.**

Wave Equation : see also Differential.

Acoustical Tube as High-Pass Filter [including Analogy with Hyper-frequency **Wave-Guides**].—Brillouin, **4190.**

Laws of Radiation of Electromagnetic Waves in Hollow Ultra-Short-**Wave Guides** of Rectangular Cross-Section.—Buchholz, **2129.**

Use of **Wave Guide** for Measurement of Micro-Wave Dielectric Constants.—Lamont, **4189.**

Research on **Wave Guides** and Electromagnetic Horns.—Morimoto, **3279.**

Propagation of Waves—

Research on **Wave Guides** and Electromagnetic Horns.—Sonada & others, **1745**, **1746** & **3719**.
Wave Guides : see also Cavities, Diffraction, Endovibrator, Guided, Horn, Hyperfrequency, Pipes, Travelling, Tube.
Weather.—Clayton, **3731** (27-Day Period) ; Philipps, **2894** (Ten-Years' Large-Scale Investigation : Solar Radiation, etc.). See also Broadcasting, Cosmic-Rays, Meteorological, Solar, and under "Atmospherics & Atmospheric Electricity" (Meteorological).
Measurements with Ultra-Short Electric Waves on **Wires.**—Hartshorn, **1747.**
Ultra-High-Frequency Propagation through **Woods and Underbrush.**—Trevor, **3720.**
X-Rays : see Dielectric-Constant.

ATMOSPHERICS AND ATMOSPHERIC ELECTRICITY

Aircraft : see Atmospherics.
Sensitive **Aneroid** Diaphragm Capsule with No Deflection above a Selected Pressure.—Brombacher & others, **1776.**
Australian Radio Research Board : Work on **Atmospherics, 933.**
Atmospherics in Radio Broadcast Reception at Calcutta.—Chakravarti, Ghosh, & Ghosh, **1329.**
Wave-Form of **Atmospherics** at Night.—Elder, Schonland, & others, **2912.**
Atmospherics and Radio Transmission Phenomena in Puerto Rico [1935/1939].—Kenrick & Sammon, **506.**
Atmospherics of Distant Origin.—Khastgir & Ray, **3747.**
Wave Form, Energy, and Reflection by Ionosphere, of **Atmospherics.**—Laby, McNeill, Nicholls, & Nickson, **2184.**
Reception of Broadcast Signals subject to Disturbance by **Atmospherics.**—Moore, **1330.**
Recording Radiogoniometer for **Atmospherics.**—Ranzi, **932.**
Direction-Finding of Transients caused by **Atmospheric** Disturbances.—Schindelhauer, **505.**
Direction-Finding of Sources of **Atmospherics,** and South African Meteorology.—Schonland & Hodges, **2185.**
Further Studies of Directions of **Atmospherics** at Toowomba and Canberra [including Estimate of Thunderstorm Risks to Aircraft].—Webster, Munro, & Higgs, **36.**
Atmospherics : see also Static.
Australian : see Atmospherics.
Balloons : see Sounding.
"Terrestrial Magnetism and Electricity" [**Book Review**], *and* "Geomagnetism" [**Book Review**].—Fleming, Chapman & Bartels, **943.**
"Physics of the Earth : Vol. 7—Internal Constitution : Vol. 8—Terrestrial Magnetism and Electricity" [**Book Reviews**].—Gutenberg, **3753.**
"Swedish Polar Year Expedition, Sveagruvan, Spitzbergen, 1932-1933 : General Introduction, Terrestrial Magnetism" [**Book Review**], **944.**
Theoretical Calculations of **Breakdown** Potential for Sphere Gaps, *and* Variation of Sparking Potential with Dense Initial Photoelectric Currents.—Meek, **3749** & **4211.**
Breakdown : see also Spark.
Broadcast : see Atmospherics.
Cathode-Ray Oscillograph : see Atmospherics, Lightning, Transient.
Phenomena in **Cloud Chamber** operated without Sweep Field.—Ruark & Pardue, **2190.**
Cosmic Rays.—Baños & others, **1339** & **1340** (Asymptotic Orbits, Stable Periodic Orbits) ; Blackett, **512** (Kelvin Lecture) ; Curtis & others, **946** (Observations in Stratosphere) ; Fermi, **2192** (Ionisation Loss of Energy) ; Godart (see Vallarta) ; Hess, **1341** (Relation to Solar, Geomagnetic, & Atmospheric Phenomena) ; Korff, **2193** (Solar Influences) and **3343** (Ionisation at Sea-Level) ; Vallarta & Godart, Gill, Forbush, **945** & **1342** (Theory of World-Wide Periodic Variations). See also under "Propagation of Waves."
Cosmic Static : see Static, Stellar.
Electromagnetic Force Effects of Large **Currents** in Interior of Conductors, and Their Calculation.—Bachert : Foitzik, **1772.**
Radio **Direction-Finding** for Meteorological Balloons at 1.67 Metres.—Yuan & Mackeown, **3752.**
Direction-Finding : see also Atmospherics, Static, and under "Directional Wireless."
Mechanism of Electrical **Discharges** in Gases of Low Pressure [with 339 References].—Druyvesteyn & Penning, **3750.**
Electrical **Discharge** on Liquid Surfaces [of Bubbles].—Snoddy, Henry, & Beams, **2525.**
Discharge : see also Spark.
Divining : see Lightning, and under "Miscellaneous."
Use of **Electrets** in Electrical Instruments [Advantage for Radio Sondes].—Gemant, **1773.**
Analysis of Local Atmospheric-**Electric** Phenomena at College, Alaska.—Gish & Sherman, **3341.**
Daily Course of Earth's **Electric Field** in Rome.—Medi, **937.**
Influence of Localised Electric Charge on Measurement of **Electric Field** of Atmosphere.—Medi, **2923.**
Observations of **Electric Field** of Atmosphere in Atlantic and Pacific Oceans.—Rouch, **40.**
Effects of Thunderstorms and Lightning Discharges on Earth's **Electric Field.**—Wormell, **936.**
Electric Potential : see Potential.
Air **Electricity** warns Planes when approaching Mountains.—Gunn, **4216.**
Hail : see Lightning.
More Precise Determination of **Humidity** from Records of Aerological Sounds.—Dybchenko, **1774.**
Improved Electric **Hygrometer** [for Radio Sondes].—Dunmore, **1344.**
Hygrometry : see also Humidity, Temperature.
Measurements of **Ionisation** of Air at Lacco Ameno (Isle of Ischia).—Imbò, **938.**
Intermediate **Ions** of Atmosphere.—Hogg, **1338.**
Mobility Spectrum of Atmospheric **Ions.**—Yunker, **511.**
Interpretation of **Ionisation** Measurements in Gases at High Pressures.—Kara-Michailova & Lea, **1337.**
Ionisation : see also Cosmic-Radiation, Nuclei, Spark.
Klydonograph : see Surge.
Lightning.—"Hot" L. in Transformer Tests, **509** ; Baumeister, **507** & **1333** (Direct Strokes, & Hazel-Twig Divining) ; Bellaschi, **508** (L. Strokes in Field & Laboratory) ; Bergvall & Beck, **4215** (and Protection on Distribution Systems) ; Berkey, **2528** (Radiation from L. Arrester Insulation) ; Dauzère, **934** & **2187** (Distribution of Strokes & Hail) ; Flowers, **2186** (Automatic Cathode-Ray Oscillographs) ; Geissler, **2527** (Cathode-Fall Arrester) ; Gross & McMorris, **4213** (L. Current in Arresters) ; Hagenguth, **2917** (Recording Instruments) ; Lewis & Foust, **2918** (on Transmission Lines) ; Matthias & others, **1334** (Protection Zone of L. Conductors) ; Met. Vickers, **2921** (Metrosil for Arresters) ; Morel, **2919** (L. & Buildings) ; Ohkohchi & Yui, **1332** (L. Waves in Windings, Velocity of) ; Rossmann, **2914** (and Hail : Nature of Thunderstorms) ; Schwaiger (see Matthias) ; Shipley, **935**, **2526**, & **3337** (Recent L. Storms) ; Weber, **1771** (Model Tests, Influence of Cloud) ; Wichmann, **2916** (Part played by L. in Thunderstorms). See also Breakdown, Currents, Discharge, Electric-Field, Protector, Spark, Surge, Transient.
Papers on **Magnetic** Activity, **940**, **942.**
Summary of Year's Work, Department of Terrestrial **Magnetism,** Carnegie Institution.—Fleming, **939.**
Report on Work in Terrestrial **Magnetism** and Electricity in U.S.S.R. during 1936/1939.—Lazarev & others, **2189.**
Magnetic (ism) : see also Book-Review, Cosmic-Radiation, Surge, and under "Propagation of Waves."
Meteorography : see Sounding.
Polarisation of Diffused Light, Radiation of Atmosphere, and Probable Indications of **Meteorological** Tendencies.—Medi, **39.**
Report on Progress in **Meteorology.**—Brunt, **947.**
Meteorology : see also Atmospherics, Soundings, Weather.
Total and Uncharged **Nuclei** at Washington, D.C.—Sherman, **3345.**
Diurnal Variation and Vertical Distribution of Atmospheric Condensation-**Nuclei,** *and* Mobility-Spectrum of Atmospheric Ions.—Yunker, **3344.**
Electric **Potential Gradient** of Lower Atmosphere, **2922.**
Local Variation of Atmospheric **Potential-Gradient** measured at Taihoku, Formosa, Japan, *and* Comment on This Paper.—Ogasahara : Torreson, **2188.**
Local Variation of Atmospheric **Potential Gradient** during Four Solar Eclipses at Taihoku.—Ogasahara, **4217.**
Protector Tubes for Power Systems.—Peterson, **3340.**
Improvements in **Radio Sonde.**—Nat. Bureau of Standards, **1343.**
Use of Grid to reduce Operating Voltage in Geiger-Müller Counters [particularly for **Radio Sondes**].—Korff & Ramsey, **4218.**
Radio Sondes : see also Sounding.
Rigorous Theory of **Recombination** of Both Small and Large Ions in Gases at High Pressures.—Harper, **41.**
Ionic **Recombination** in Gases.—Sayers, **2191.**
Recombination : see also Cloud-Chamber, and under "Propagation of Waves."
Recording : see Lighting, Surge, Transient.
Demonstration of Aerological Radio **Sounding** Equipment, *and* Upper-Air Weather **Soundings** by Radio.—Diamond, **42** & **3342.**
Automatic Radiometeoric Stations [for Investigations with **Sounding** Balloons].—Francini, **1345.**
Improvement in Radio-**Sounding** Balloons : a Short-Cycle Radiosonde.—Piccard & Larsen, **510.**
Soundings : see also Aneroid, Direction-Finding, Electrets, Hygrometer (try), Radio-Sonde.
Enclosed **Spark Gaps** [and Effect of Ionising Radiation].—Berkey, **4214.**
Sparking Threshold in Air.—Haseltine, **3748.**
Mechanism of **Spark** Discharge in Air at Atmospheric Pressure.—Loeb & Meek, **4212.**
Theory of **Spark** Discharge.—Meek, **2524.**
Variation of **Sparking** Potential with Initial Photoelectric Current.—Meek, **3339.**
Laboratory Study of **Spark** Discharge between Conducting Clouds.—Snoddy & Beams, **1335.**
Rôle of Ionisation by Positive Ions in **Spark** Breakdown.—Varney, Loeb, & Haseltine, **1336** & **2920.**

Atmospherics and Atmospheric Electricity—

Spark : see also Breakdown, Discharge.
Cosmic **Static** [Intensity/Galactic-Longitude Curve follows Computed Curve].—Reber, **1769.**
Static emanating from Six Tropical Storms, and Its Use in locating Position of Disturbance.—Sashoff & Weil, **504.**
Directional Characteristics of Tropical Storm **Static.**—Sashoff & Roberts, **2913.**
Physics of **Stellar** Interiors and Stellar Evolution, *and* Spectra of Supernovae.—Bethe & Marshak : Hunter, **1770.**
Developments in Electric **Surge** Recording [by Klydonograph].—Candler, **3338.**
Magnetic **Surge** Integrator, Fulchronograph, and Magnetic Surge-Front Recorder.—Wagner & McCann, **3751.**
Temperature Measurement and Hygrometry in Radio-Meteorography.—Powell, **1775.**
Atmospheric Disturbances due to **Thundercloud** Discharges.—Chapman, **37.**
Photographs of Unusual Discharges occurring during **Thunderstorms.**—Holzer & Workman, **38.**
Origin and Distribution of **Thunderstorm** Electricity.—Humphreys, **2915.**
Thunderstorms : see also Atmospherics, Electric-Field, Lightning.
Recording **Transient** Disturbances, *and* Automatic Cathode-Ray Oscillograph.—Grismore : Gaines, **1331.**
Use of Millibar in **Weather** Bureau Reports [Protest].—Sharp, **1777.**
Weather : see also Meteorological.

PROPERTIES OF CIRCUITS

Amplification, Amplifiers.—Bode, **4231** (Relations between Attenuation & Phase) ; Brubaker, **2205** (D.C. Amplifier) ; Chistyakov, **58** (Effect of Input Impedance of Valve) ; Edwards & Cherry, **4233** (Frequency Compensation) ; Freeman, **2531** (Shunt Peaking Compensation for Wide-Band As.) ; Gordon, **60** (Class B) ; Holbrook & Dixon, **3352** (Load-Rating Theory) ; Huntoon, **3351** (Square-Wave Analysis) ; Kobayashi, Kurokawa, **950** & **951** (Feedback A.) ; Krize, **3762** (Choice of Operating Conditions for Final Stage) ; Lang, **2206** (Resistance As.) ; Liu & Trimmer, Jacobsen, **525** & **4232** (Compensated As : Distortion) ; Lockhart, **4234** (Effect of Gain Control on Input Admittance) ; Mansfield, **63** (Damping Reduction of Separately Excited As.) ; Marino, **1788** (Theory of R.F. Amplification : " Control-Limit Line ") ; O'Brien & Kees, **1793** (High-Efficiency R.F. Amplifier) ; Pedersen, **1787** (Distortion-Free A.) ; Petrauskas & Van Atta, **2204** (High-Gain Linear A. with Degeneration) ; Pieplow, **2530** (Wide-Band As : H.F. Correction by Auxiliary Valves) ; Pinciroli, **1791** (Power A. at Acoustic Frequencies) ; Rizkin, **2946** (Compensation of Output Impedance & Reduction of Transient Processes) ; Rodwin & Klenk, **3757** (High-Gain A. for 150 Mc/s) ; Siforov, **59** (Tuned A. with Detuned Anode Circuit) ; Simon & others, **1370** (Class C R.F. Power A.) ; Sponzilli, **1792** (Bridge-Type Direct-Current A.) ; Tanaka, **2948** (Inverted-Type Short-Wave A.) ; Terman & Buss, **3761** (Linear & Grid-Modulated As.) ; Waddel, **65** (Neg. Feedback Linear Pulse A.) ; Watanabe & others, **952** & **2947** (Transient Phenomena of Feedback As.). See also Capacity, Distortion, Feedback, Inverted, Linearisation, Magnetic, Negative-Feedback, Noise, Phase-Inversion, Push-Pull, Regulation, Transient, Ultra-.
Electromechanical **Analogies.**—Bordoni, **3355.**
Design of **Attenuation** Equaliser.—Wake, **4239.**
Attenuation : see also Filters.
Automatic Regulation : see Capacitance.
Theory of Retarding **Back-Coupling.**—Gorelik, **540.**
Balancing of D.C. Clicks [in Telephones].—Sakamoto, **3362.**
Simple Treatment of **Band-Pass** Filters [avoiding Complex Hyperbolic Functions].—Greig, **1801.**
Simple **Band-Pass** X-Circuits [and Equivalent Bridge-Type Circuits].—Rabe, **1364** & **2937.**
Beat Theory : see Non-Linear.
Bernamont Effect : see Fluctuations.
" Rundfunksiebschaltungen " [Broadcast Filter Circuits : **Book Review**].—Feldtkeller, **3770.**
Brief Summary of **Bridge** Networks.—Seeley, **1800.**
Stabilised **Bridge** Circuit.—Kalmus, **1369.**
Bridge Circuits : see also Amplifiers, Band-Pass, Non-Linear, Null-Circuits.
Building-Up Processes in Broadcast Band-Filters.—Gensel, **2936.**
By-Pass : see Capacity.
Approximate Calculation of Electric Field and Capacities for Some Simple Forms of Telephone **Cable.**—Meinke, **2944.**
Ultra-Short Waves in Concentric **Cables** and " Hollow-Space " Resonators with Perforated Disc Ends, *and* Concentric **Cables** with Longitudinally Stratified Dielectric as Band-Stop Filters in *m* Wave Range and Below.—Buchholz, **1347.**
Cables : see also Concentric-Line, Lines.
Loss Angle of Voltage-Regulated **Capacitance.**—Thon, **44.**
New Uses of **Capacitors** in Control Circuits.—Winter, **522.**
Effect of Screen By-Pass **Capacity** on Response of Single Stage.—Baker & Connolly, **524.**
Choosing the **Capacity** of Tuned Circuits in designing Amplifiers.—Chistyakov, **1790.**
Cathode-Follower : see Feedback.
Natural Oscillations of Electrical **Cavity** Resonators.—Barrow & Mieher, **2924.**
Class AB : see Push-Pull.
Compensation : see Amplifiers, Compensator.
Vacuum-Tube Alternating-Voltage **Compensator.**—Cooter, Wenner, & Peterson, **4238.**
Outline of Theory of Algebraic **Complex Operators,** with Applications to Electric Circuit Theory.—Hirst, **1351.**
Concentric-Line Resonator Filter Circuits for Ultra-High Frequencies.—R.C.A., **3755.**
Input **Conductance** Neutralisation [at Ultra-High Frequencies].—Freeman, **514.**
Constant Current Sources.—Green & Kuper, **4237.**
Cloud-Chamber **Control** Circuit [using Neon-Filled Cold-Cathode Thyratrons].—Getting, **534.**
Control : see also Capacitors.
Graphical Solution of Natural Frequencies and Damping Factors for Condensive or Inductive **Coupled** Circuits.—Nakai, **963.**
Coupled Circuits coupled by Inductance depending on Current.—Taeger, **50.**
Coupling of Dipole and Quadripole Circuits and Matching of Impedances.—Ferrari-Toniolo, **1359.**
Application of Low-Frequency Circuit Analysis to Problem of Distributed **Coupling** in Ultra-High-Frequency Circuits.—King, **515.**
Generalised **Coupling** Theorem for Ultra-High-Frequency Circuits [Parallel Lines].—King, **2194.**
Coupled, Coupling : see also Determinants, Parallel-Wire, Space-Charge.
Calculation of **Cross Modulation** in Multi-Channel Transmission with Large Number of Channels.—Lubny-Gertsyk, **2945.**
Condensers for **Crystal** Filters.—Renne & Alekseev, **2933.**
Electric Wave Filters employing **Crystals** with Normal and Divided Electrodes.—Mason & Sykes, **2932.**
Damping-Reduction : see Amplifiers.
Presentation of **Decaying** Oscillations as Stationary Images on Cathode-Ray Tube.—Czech, **1803.**
Detector : see Regenerative.
Application of Properties of Three Types of **Determinants** to Calculation of Natural Frequencies of Coupled Oscillating Systems.—Parodi, **4221.**
Dielectric Losses in Radio Circuits.—Bogle, **2529.**
Differential Equation with Limiting Cycle.—Bautin, **955.**
Behaviour of **Diode** Detector to Signal Modulated in Amplitude and Phase.—Cocci, **517.**
Contribution to Theory of **Diode** Rectifier [applicable also to Dry-Plate Rectifier].—Oplustil, **3349.**
Diode Operating Conditions.—Sturley : Court, **154** & **1794.**
Dipole Circuits : see Coupling, Negative-Resistance.
Distortion in Valves with Resistive Loads : Graphical Methods for Its Determination.—Bloch, **608.**
Effect of Non-Linear **Distortion** in Multi-Channel Amplifiers.—Jacobsen, **4232.**
Distortion : see also Amplifiers.
Convex **Endovibrators,** *and* Toroidal **Endovibrators.**—Neiman, **513** & **1778.**
Energy Considerations applied to Telegraph Equation.—Kneschke, **2541.**
Energy Cycles in Auto-Oscillating Systems of Thomson Type.—Teodorchik, **1365.**
Operation within Pull-In Range of Auto-Oscillating System of Thomson Type examined from Standpoint of **Energy** Balance.—Teodorchik, **2538.**
Equalisers : see Amplifier, Attenuation, Compensator, Constant-Current, Impedance, Network.
Application of **Feedback** to Wide-Band Output Amplifiers.—Everest & Johnston, **1786.**
Use of **Feedback** at Audio Frequencies.—Kotlov, **94.**
Theory of Multi-Stage **Feedback** [in Transmitters].—Model & others, **1785.**
Feedback [General Survey : Stability Conditions (with Simple " Pi-Attenuation " Rule) : Practical Circuits (Cathode Follower, etc.) : Phase-Shift Measurement : etc.].—Sandeman, **3763.**
Feedback improves Electromechanical Recording.—Vieth, **1784.**
Feedback : see also Amplifier, Back-Coupling, Negative, Oscillator, Regeneration, Retroaction.
Quantitative Relations governing Working of **Ferromagnetic** Frequency Demultiplier.—Dehors & Rouelle, **1367.**
Ferromagnetic : see also Iron-Cored.
Filter.—Astbury, **961** (Progress) ; Borst, **4222** (Design Charts) ; Brillouin, **4223** (Networks with Elements changed by Constant Factor) ; Darlington, **1361** (Synthesis of Reactance 4-Poles) ; Kamiya, Piloty (see also Piloty), **958** (New Design Methods : Wave Separators) ; Laurent, **960** (Practical Computation by Frequency Transformations) ; Listov, **3769** (Possible New Properties of Chain F. Circuits) ; Madia, **1799** (Cauer Theory applied to Campbell-Zobel Ladder Fs.) ; Matsumoto, **964** (Improvement on F. Repeating Coil) and **2938** (Design of Ladder F. by means of Open & Short-Circuit Reactances) ; Mühlner, **520** (Band Fs,

without & with Retroaction); Piloty (see also Kamiya), **46** (Separating Fs.) and **959** (particularly Symmetrical & "Anti-metrical," with Predetermined Performance); Schmidt, **2196** (Condenser & Coil Values); Stanesby, **3357** (Resistance-Compensated Band-Stop F.); Wisgrill, **3356** (Calculation by Working Transmission Equivalent); Wucherer, **47** (3-Circuit Band-Pass Fs.). See also Band-Pass, Book-Review, Building-Up, Cables, Concentric-Line, Coupled, Crystal, Impedance, Magnetostriction (ive), Nyquist, Parallel-Wire, Quartz, Selectivity.

Potential **Fluctuations** at Ends of Conductor of Small Volume traversed by Current [Bernamont Effect].—Surdin, **1779.**

Fluctuations : see also Noise.

Particular Relationships between **Frequency Characteristic** and Transient Function.—Kharkevich, **1353.**

Fundamentals of **Frequency Correction** [without Filters].—Likel, **1352.**

Discussion on "Quasi-Stable **Frequency-Dividing** Circuits."—Mahmoud: Fortescue, **57.**

Frequency Division, Multiplication : see also Ferromagnetic, Iron-Cored, Parametrical, Synchronisation.

Frequency Stabilisation : see Negative-Feedback, and under "Transmission" and "Measurements & Standards."

Frequency-Transformations : see Filter.

Power-Tube Performance as influenced by **Harmonic Voltage.**—Sarbacher, **3350.**

General Solution of **Helmholtz** Equation, taking into Account Effect of Iron.—Kovalenkov, **4236.**

Investigation of Electromagnetic **Hollow Spaces.**—Müller, **1346.**

Hum-Neutralising Circuit for Use with Augetron, **3768.**

Employment of Variable-Mu Amplifying Valve as Element of Variable **Impedance.**—Chireix, **2929.**

Constant-Loss **Impedance-**Transforming Network.—Daven Company, **256.**

Transmission Properties of Cross-Connected Mesh of Resistance-Reciprocal **Impedances** [Equalising Network], with Special Consideration of Time of Transit.—Krambeer & Erdniss, **962.**

Constant **Impedance** Equalisers: Simplified Method of Design and Standardisation.—Pyrah, **53.**

Impedance Networks [Filter Synthesis, Constant Input Impedance and Distortion-Correcting Networks].—Rivlin, **1798.**

Impedance : see also Amplifier, Coupling, Line, Matching, Non-Linear.

Integral Equations of Continuous Dynamical Systems.—Ingram, **4224.**

Inverted Amplifier.—Strong, **4230.**

Operational Treatment of Circuit having **Iron-Cored** Inductance Coil.—Kumagai, **3361.**

D.C. Excited **Iron-Cored** Variable Reactance Coil and Current Transformer for Direct Current.—Ohasi & Wada, **2214.**

Application of Fourier Analysis to Problem of Frequency Multiplication [by **Iron-Cored** Couplings].—Pongratz, **2213.**

Iron-Cored : see also Coupled, Ferromagnetic, Helmholtz, Magnetic, Non-Linear, Transducer.

Mutual Interference, and Its Elimination, in Two **Line** Circuits Parallel to Each Other.—Hirota, **2943.**

General Reciprocity Theorem for Transmission **Lines** at Ultra-High Frequencies.—King, **3346.**

Investigation of Propagation Phenomena in Unsymmetrical Multipole Conductor as Development of Multipole **Line** Theory.—Koizumi, **55.**

Investigation of Telegraph Artificial **Line.**—Naumov, **3348.**

Resonant Impedance of Transmission **Lines** [as Circuit Elements in Ultra-High-Frequency Receivers, etc.].—Nergaard & Salzberg, **43.**

Velocity of Propagation and Transient Period on Uniform **Lines** and Pupinised Cables.—Possenti, **521** & **1355.**

Lines with Non-Uniformly Distributed Parameters [as Impedance Transformers, etc.].—Volpert, **3754.**

Some Impedance Characteristics of Tapped Resonance-**Line** Circuits.—Willshaw, **3347.**

Lines : see also Concentric, Coupling, Integral-Equations, Non-Linear, Parallel, Transient, Transmission, and under "Propagation of Waves."

Linear Modulation Network.—Akiyama, **4227** & **4228.**

Investigations on **Linearisation** of Cascade Amplifiers.—Holzwarth **1789.**

Magnetic Voltage Amplifier.—Feldbaum, **4235.**

Inductor with Air-Gapped **Magnetic** Circuit.—Marinesco: Glazier: G.W.O.H., **2212** & **3363.**

Differential **Magnetostriction** Filter.—Fukushima & Koitibara, **965.**

Properties of **Magnetostrictive** Resonator of Rod Type, and Experiments on Narrow-Band Filter of Differential Type.—Kobayashi & Endo, **2934.**

Impedance **Matching.**—Preisman, **1360.**

Matching : see also Coupling, Parallel.

Application of **Matrix Calculation** in Electrotechnics.—Strecker, **2540.**

Matrix Theory of Oscillatory Networks.—Pipes, **957.**

Matrix Theory : see also Networks.

Mitnahme : see Oscillations.

Note on **Modulation** [Reference also to Super-Regeneration, Circuits with Varying Parameter, etc.].—Brainerd, **2925.**

Modulation : see also Linear, and under "Transmission."

Mechanism of Operation of **Multivibrator.**—Hukata & Orihara, **3772.**

Natural Frequencies : see Oscillations, Vibrating-Systems.

Negative-Feedback Amplifiers: Problems of Stabilisation, **3764.**

Importance of Nyquist Diagrams in Study of **Negative-Feedback** Amplifiers and Their Stability, of Filters, etc.—Levy, **2207.**

Negative Feedback Applications.—Lockhart, **3765.**

Negative Feedback applied to Oscillators [for Frequency Stabilisation, Source of Frequency-Modulated Signals].—Sabaroff, **3766.**

Some Applications of **Negative Feedback,** with Particular Reference to Laboratory Equipment.—Terman, Buss, Hewlett, & Cahill, **64.**

Negative Feedback : see also Amplifier, Feedback.

Reactances with **Negative Inductive or Capacitive** Characteristics (Negative Inductances and Capacitances).—Vilbig, **2928.**

Essay in Systematic Treatment of Dipole Circuits with Differential **Negative Resistance.**—Carrara, **1357.**

Experimental Researches on Circuits containing Type N Dipoles with Differential **Negative Resistance.**—Budini, **1358.**

Application of Tensor Concept to Complete Analysis of Lumped, Active, Linear **Networks.**—Epstein & Donley, **516.**

Duality of Lagrangean Equations of Motion in Fundamental Equations of **Networks.**—Okada, **2198.**

Transformation Theory of General Static Polyphase **Networks.**—Pipes, **1797.**

Network-Selecting Chart [for Equalising & Balancing Networks].—Selgin, **527.**

Networks : see also Bridge, Filter, Impedance, Linear, Matrix, Non-Linear, Poisson-Integral, Quadripoles, Resistance, Transient.

Neutralisation : see Conductance, Hum.

Internal **Noise** of Receivers and Amplifiers.—Klemt, **949.**

Valve and Circuit **Noises :** Designing RF and Frequency-Changer Stages for High Signal/Noise Ratio, **2202.**

Noises : see also Fluctuations.

Non-Linear Circuits: Graphical Determination of Performance.—Frommer & Rédl, **1782.**

Beat Theory of **Non-Linear** Circuits [and Application to Transmission Line Circuits].—Keller, **51.**

Non-Linear Resistances in A.C. Circuits.—Ledward, **2535.**

Voltage Control with **Non-Linear** Wheatstone Bridge.—Richter, **3775.**

Equivalent Impedance of **Non-Linear** Element in Linear System.—Shembel, **532.**

Unstable **Non-Linear** Circuit [Iron-Cored Reactance shunted by Capacitance, in Series with an Impedance].—Summers, **3380.**

Non-Linear Resistance Elements in Circuit Networks.—Wold, **2534.**

Non-Linearity : see also Amplifiers.

Bridged-T and Parallel-T **Null Circuits** for Measurements at Radio Frequencies.—Tuttle, **1363.**

Versatile Oscillator—**Numans** [and Transitron] Circuit.—Cocking, **3767.**

Foundation and Import of Heaviside **Operational** Calculus.—Wagner, **1350.**

Oscillating System with Small Losses [for Micro-Wave Frequency-Stabilisation].—Bunimovich, **1348.**

Radiation from Point Charge revolving in Circular Orbit [and Natural Frequency of **Oscillations** of Thin Ring].—Poritsky, **2195.**

Theory of [Mechanical] Auto-**Oscillations** produced by Forces effective by Virtue of Their Position only.—Strelkov, **2199.**

Instability of Linear and Non-Linear **Oscillations** ["Mitnahme" Oscillations].—Wenke, **2537** & **2927.**

Tuned-Grid Tuned-Plate **Oscillator.**—Mouromtseff, **4229.**

Oscillators & Oscillatory Systems : see also Cavity, Decaying, Determinants, Differential-Equation, Energy, Numans, Quasi-Harmonic, Relaxation, Single-Circuit, Synchronisation, Vibrating.

Theory of Coupled **Parallel-Wire** Systems.—Usui, **4220.**

Particular Case of **Parametrically Coupled** Systems [and Possibility of Varying Continuously Speed of Parametrical Motor: Frequency Transformation in Practically Any Ratio].—Papalexi, **1780.**

Phase Convention of Currents and Voltages in Valve Circuits.—G.W.O.H., **1795.**

Use of **Phase-Inversion** Circuits in L.F. Amplifiers of Radio Receivers.—Govyadinov, **97.**

Phase : see also Feedback, Regeneration.

Poisson Integral and Applications to Theory of Linear Alternating-Current Circuits (Networks).—Cauer, **2539.**

Push-Pull and Class AB Connection.—Boë, **1371.**

Polynomial **Quadripoles** of Prescribed Frequency Variation.—Bader, **2940.**

Quadripoles : see also Coupling, Filter.

Note on Determination of Equivalent Electrical Constants of **Quartz-**Crystal Resonator.—Builder, **2930.**

Quick Building-Up of Electron-Coupled **Quartz** Oscillator.—Hayasi & Akasi, **552.**

Quartz Crystal Vibrators as Elements for Electrical Wave-Filters.—Kamayachi & Ishikawa, **966.**

Properties of Circuits—

New GT **Quartz** Crystal with High Frequency-Constancy over Wide Temperature-Range.—Mason, **3358.**
Tone-Frequency Control- and Filter-**Quartzes.**—Rohde, **2197.**
Electro-Acoustic Reactions, with Special Reference to **Quartz**-Crystal Vibrators.—Starr, **2931.**
Quartz : see also Crystal, and under "Transmission" and "Measurements & Standards."
Experimental Investigation of **Quasi-Harmonic Vibrator** [of Mathieu Type].—Neusinger, **1781.**
Gas Discharge Tubes in **Quench** Circuits.—Windred, **2210.**
Reciprocity and Generalised Concept of Transducer in Radio Links.—Latmiral, **1349.**
Reciprocity Theorem : see also Lines.
New Method of Logarithmic **Rectification.**—Hayasi & Akasi, **3759.**
Constant-Potential **Rectification.**—Stevens & Walker, **1796** & **2939.**
Calculation of Hum Voltage in Mains **Rectifier** Circuits.—Rentsch, **2211.**
Full-Wave **Rectifier** Analysis.—Wallis, **2536.**
Critical Inductance and Control **Rectifiers.**—Overbeck, **56.**
Behaviour of Half-Wave **Rectifiers.**—Stout, **530.**
Rectifiers : see also Diode, Non-Linear.
Phase Relationship at Parametric **Regeneration** in Valve Circuits.—Lyubchenko, **954.**
Frequency Characteristic of Regeneration in **Regenerative** Detector, and Improved Regeneration System.—Kanazawa, **2200.**
Stability of **Regenerative** Circuits.—Rivlin, **3353.**
Investigation of Main Circuits of **Regenerative Repeater** [American Type using a Tuning-Fork Vibrator].—Malyshev, **2935.**
Concerning Thermionic **Regulation** of D.C. Generators [and Sources of Instability in Amplifier or Generator].—Danforth, **2203.**
Correction to Equation in "New Hard-Valve **Relaxation** Oscillator."—Black, **2208.**
Equation $d^2 \log y/dx^2 = 1 - y$ when $y > 0$ [Connection with **Relaxation** Oscillations of NeonLamp].—Carson & Richardson, **533.**
Relaxation Oscillations [Mechanical, Electrical, & Biological Phenomena].—Herrender-Harker, **2942.**
Relaxation Oscillators : see also Quasi-Harmonic, Synchronisation.
Relays : see Transducer, and under "Subsidiary Apparatus & Materials." Also Automatics, under "Miscellaneous."
Resistance Networks: Complete Design Tables.—Colchester & Gough, **2532.**
Temperature-Independent Electrical **Resistances** [Compensation Methods].—Hildebrandt, **2533.**
Power and Attenuation in Terminating **Resistances.**—Skalicky, **526.**
Retarded **Retroaction.**—Gorélik, **1783.**
Retroaction : see also Feedback, Filters, Regeneration.
Intermediate-Frequency **Selectivity** in Receivers for Commercial Radio Services [Composite Band-Pass Filter].—Moore & Moore, **1362.**
Note on **Self-Induction** [and Misunderstandings concerning "Rate of Change of Flux"].—O'Rahilly, **1804.**
Oscillation Frequency and Tuning in Externally Controlled **Single-Circuit** Transmitters.—Buschbeck, **1802.**
Calculation of **Skin-Effect** by Method of Perturbations.—Rytov, **4219.**
Valve-Operated **Smoothing** Circuit: Balancing-Out Hum, **646.**
Further Applications of **Space-Charge Coupling.**—Sargrove, **3760.**
Multi-Stage **Standing-Wave** Circuits [Merits, Electrical or Acoustical].—Okabe, **3756.**
Super-Regeneration : see Modulation, and under "Reception."
Design Calculation of **Surge** Circuit for Surge Voltage of Given Wave-Form.—Marguerre, **535.**
Simplified **Surge**-Generator Equations.—Higgins, **3354.**
Simplification of **Switching** Circuits in General.—Piesch, **967.**
Electronic Valves as Controlled **Switching Devices.**—Vecchiacchi, **1368.**
Theory of **Synchronisation.**—Bautin, **531.**
Synchronisation of Simple Relaxation Oscillator.—Builder & Roberts, **2926.**
Synchronisation of Thyratron [Saw-Tooth] Oscillator.—Gulyaev, **2209.**
Synchronisation of Self-Excited Valve Transmitters, with Special Attention to Frequency Division.—Schlicke, **1366.**
Tensor Concept : see Networks.
Thermistor Voltage-Regulator.—Green & Pearson, **3774.**
Thermistors, Their Characteristics and Uses.—Pearson, **3359.**
Thermistors : see also Varistors.
Thyratron : see Control, Synchronisation, and under "Subsidiary Apparatus & Materials."
The [Iron-Cored] **"Transducer"** and Applications.—Lamm, **3771.**
Transducer : see also Reciprocity.
Analysis of Operation of Differential **Transformer.**—Remnev, **49.**
Simple Circle Diagram for Doubly Excited Magnetic Circuit [*e.g.* a Loaded **Transformer**].—Unger, **2215.**
Design Calculations of Wide-Band **Transformers,** taking into Account the Capacitative Effects [using Band-Filter Theory].—Hegner, **48.**
Wattless Circuit-Factor and Its Circle-Diagrams of **Transformers** with Secondary Condensers.—Ozawa, **2216.**
General Theory of Oscillatory Phenomena in Windings of **Transformers.**—Pirenne, **1356.**
Transformers : see also Iron-Cored.
Graphical Analysis of **Transient** Phenomena in Electric Circuits.—Dejuhasz, **66.**
Theorem of Laplace Function Transformation on Division into Steady and **Transient** Phenomena with Direct and Alternating Current, and Theorem of **Transients** of Complex Transformation.—Droste, **953.**
Transient Phenomena due to Starting and Stopping of Currents in Electric Circuits.—Giorgi, **1354** & **2941.**
Transient Theory of Two Parallel Line Circuits.—Hirota, **4225.**
Transient Response in Television.—Kallmann, **68.**
Transients in Switching Installations.—Koch, **67.**
Transient Analysis of Symmetrical Networks by Method of Symmetrical Components.—Pipes, **4226.**
Transient Amplifier Analysis.—Walker, **523.**
Transients : see also Amplifiers, Energy, Frequency-Characteristics, Lines, Quartz, Surge.
Transmission Equivalent [of Line or Telephone Apparatus] and Its Calculation from Overall Transmission Loss Curve (Frequency Curve) of Transmission System.—Braun, **54.**
Ultra-Short-Wave Wide-Band Amplification.—Strutt & van der Ziel, **948.**
Ultra-High, -Short : see also Amplifier, Cables, Cavity, Concentric-Line, Conductance, Coupling, Endovibrator, Hollow-Spaces, Inverted, Line, Oscillating, Standing-Wave.
Valve Circuit Conventions.—Bell: G.W.O.H., **2201.**
Varistors : Their Characteristics and Uses.—Becker, **3773.**
Varistors : see also Thermistor.
Natural Frequencies of **Vibrating Systems.**—Southwell, **956.**
Voltage-Control : Voltage-Regulated : see Compensator, Non-Linear, Thermistor: Capacitance.
Voltage Dividers for Extended Frequency Ranges.—Everest, **3758.**

TRANSMISSION

Narrow-Band Constant-Level Speech **Amplification.**—Turney & Shimer, **2961.**
High-Efficiency R.F. **Amplifier** [80% Efficiency obtained].—O'Brien & Kees, **1822.**
Limit of Stable Operation for Short-Wave High-Power **Amplifiers.**—Tanaka, **2963.**
Inverted-Type Short-Wave High-Power **Amplifier.**—Tanaka, **2964.**
Linear and Grid-Modulated Radio-Frequency **Amplifiers.**—Terman & Buss, **3794.**
Pointers on Design and Adjustment of High-Efficiency Grid-Modulated **Amplifiers :** Experimental Transmitters using Terman-Woodyard System.—Winkler, **78.**
Amplifiers : see also Doherty, Inverted, Neutralisation.
Arc : see Plasma.
Asymmetric-Sideband : see Selective-Sideband.
Five **Bands** without Changing Coils [1.75 to 30 Mc/s by setting Tuning Dial].—Ferrill, **562.**
Barkhausen-Kurz Oscillations with Positive Ions [in Place of Electrons in Cylindrical Triode].—Elliott & Ratcliffe, **1815.**
Theory and Design of Friction Regulator in **Baudot** Transmitter.—Zeliger & Vinokur, **2970.**
Beam Tubes as Ultra-High-Frequency Generators.—King, **70.**
Beam : see also Space-Charge, Velocity-Modulated.
Generation and Reception of Centimetric and Decimetric Radio Waves, 1934/1939 [**Bibliography**], **73.**
"Der Kurzwellensender" [Low-Power Short-Wave Transmitter: **Book Review**].—Behn & Monn, **1388.**
"Theory and Design of Valve Oscillators" [**Book Review**].—Thomas, **82.**
Specification and Testing of **Broadcast** Transmitters [in England, Holland, & U.S.A.].—Rao, **84.**
One-Kilowatt **Broadcast** Transmitter.—Reise, **1387.**
500-Kilowatt High-Efficiency **Broadcast** Transmitter.—Weldon, **3796.**
Special-Events Transmitter [for Outside **Broadcasts**].—Langham, **560.**
Novel Features in WHAS (Louisville) **Broadcasting** Transmitter and Aerial System.—Doherty & Towner, **83.**
Broadcasting : see also Compression, Frequency-Modulation, Monitoring, Selective-Sideband.
Capacitance : see Frequency-Modulation (Thon), Oscillator.
Cathode Modulation : Combining Grid and Plate Modulation for Economy and Efficiency.—Jones & Edmonds, **79.**
Cathode Modulation : 'Phone/C.W. Transmitter with Volume Compression and Adjustable Audio Response.—Edmonds, **551.**
Cathode Modulation [giving Combination of Grid-Bias and Anode Modulation].—Spitzer, Nekut, & Waller, **2960.**
Cathode Rays : see Electron, Energy, Space-Charge.
Natural Oscillations of Electrical **Cavity** Resonators.—Barrow & Mieher, **2951.**
Cavity : see also Hollow-Spheres.
Charged Particles : see Magnetron.
C.A.A. Use of **Coaxial Wires** for Ultra-High-Frequency Tuned Circuits, **3783.**
New **Coil-Coupling** System [in Transmitting Circuits].—R.C.A., **3795.**
Application of **Composite** [Frequency-and-Amplitude] **Modulation** to Problems of Side-Band Width Contraction.—Hayasi & Yamagiwa, **2225.**

Transmission—

Composite Modulation : see also Efficiency.
Compression with Feedback [for Broadcasting Transmitters].—Stewart & Pollock, **2556.**
Condensers (Air) : see Spark-Over.
Extended Variable Frequency **Crystal** Control.—Goodman : Hayes, **2986.**
Tritet **Crystal** Oscillator [combining Function of Frequency Multiplier].—Koga & Yamamoto, **3383.**
Beat-Frequency **Crystal** Oscillator : Long-Wave Oscillator using Short-Wave Oscillating Crystal Plates.—Koga & Yamamoto, **3791.**
Simplified Exciter Circuit : Electrical Variation of **Crystal** Frequency.—MacGeorge, **2557.**
Crystal : see also Quartz, and under " Properties of Circuits " & " Measurements & Standards."
Doherty System for Amplification of Modulated Oscillations.—Drabkin, **3797.**
Special Method for increasing **Efficiency** of Radio-Communication [Simultaneous Amplitude and Frequency or Phase Modulation].—Tetelbaum, **973** & **2224.**
Electron Lens with Transit-Time Phenomena, *and* Achromatism of Electron Lenses.—Recknagel : Nesslinger, **2219.**
Velocity Changes of **Electrons** in Deflecting Condenser at Ultra-High Frequencies.—Döring, **2220.**
Electron Beams : see Beams, Electron-Motion.
Electron-Coupled : see Quartz.
Model Tests on **Electron-Motion** in Alternating Fields [and Give-and-Take of Energy].—Brüche & Döring, **2221.**
Electronic Generation of Electromagnetic Oscillations.—Condon, **4240.**
Convex **Endovibrators** [and Advantages for Very Short Waves].—Neiman, **536.**
Energy Turn-Over in Transverse Control of Cathode Ray in Ballistic Model.—Hollmann, **1376.**
Energy : see also Electrons, Electron-Motion, Electronic.
Theory of Multi-Stage **Feedback** [in Transmitters].—Model & others, **1823.**
Anti-Harmonic **Filters :** Uses in reducing Radiation.—Chambers & Bacon, **558.**
Focusing : see Space-Charge.
Frequency-Changer : see Parasitic.
Frequency Control by Thermionic Valves.—Weitzenmilier, **2227.**
Heterodyne Exciter : Stabilised **Frequency-Control** Unit for Transmitters.—Bliss & Bailey, **3378.**
Theory of **Frequency-Controlled** Oscillators.—Sabaroff, **4250.**
Method of measuring **Frequency Deviation.**—Crosby, **3369.**
Frequency Modulation.—**546** (Transmitters for 25 Broadcasting Stations) ; Bosse, **2223** (Measurement of Frequency Excursion) ; Breitwieser, **3787** (*versus* Phase Modulation) ; Carnahan, Loughren, **2554** (in Television) ; Crosby, **1384** & **3370** (Service Range) and **2957** & **3784** (Reactance-Tube Modulators) ; David, **3788** (Broadcast Transmitters) ; Doherty, **4246** (Synchronised F.M.) ; Goodman, Grammer, **1385, 1813, 2958** (Amateur) ; Gunther, **2553** (Two Main Types of Transmitter) ; G.W.O.H., Pollack, **77, 545, 2551, 3785, 3786** (Amplitude, Frequency, & Phase Modulation) ; Guy, **3789** (Performance Characteristics) ; Koga, **3373** (Variable-Resistance Device) ; Lawson, **4245** (by Phase-Shifting of Sidebands) ; L. & Weighton, **545** (Frequency or Phase M ?) ; Maeda, **3374** (Theory) ; Metschl, **1382** (Nature & Use) ; Morrison, **3372** (New Circuit for Broadcasting) ; Pollack, **3374** (Interference) : see also G.W.O.H ; Roberts, **3790** (Principles & Applications to Transmitters & Receivers) ; Scott, **4247** (Frequency *versus* Phase Modulation) ; Sheaffer, **1814** (Modulator : Analysis & Application) ; Shelby, **76** & **2552** (Cathode-Ray F.M. Generator) ; Thon, **75** (Loss Angle of Voltage-Regulated Capacitance) ; Warner, **972** (Success of Triple Relay) ; Yocum, **1383** (Survey). See also Composite, Efficiency, Frequency-Deviation, Modulation, Phase-Modulation, Ultra-High. Also under " Reception " and " Stations, Design & Operation."
Application of Fourier Analysis to Problem of **Frequency Multiplication** [by Iron-Cored Couplings].—Pongratz, **2229.**
Stabilised Variable-**Frequency** Oscillator.—Brown, **3379.**
Frequency Stability of Oscillators with Negative Differential Transconductance.—Faulstich, **555.**
Oscillators with Current-Limited Multiple-Grid Valves [giving New Possibilities in **Frequency Stabilisation,** etc.].—Golicke, **1817.**
Frequency Stability [Analysis].—Posthumus & Douma, **554.**
Limits of Inherent **Frequency Stability.**—Roberts, **3380.**
Frequency-Stabilisation of Oscillation Generator with Help of Auxiliary Valve coupled to It.—Schotel, **1818.**
Frequency-Stabilisation : see also Frequency-Control, Frequency-Variations, Grid-Current, Hollow-Spaces, Inductance, Line, Standing-Wave, and 3379.
Frequency Variations in Self-Oscillator due to Space-Charge.—Sakamoto, **975.**
Frequency-Variations of Valve Oscillator from Natural Frequency of Linear Circuit.—Shembel, **976.**
Single-Dial Frequency Control : **Gang-Tuned** Transmitter aligned with Receiver Calibration.—Rice, **2968.**
Properties and Design Calculations of Oscillator free from **Grid Current** and with Frequency Adjustment.—Zaiser, **2226.**
Power Oscillators : Circuit for Surface **Hardening of Steel.**—Babat & Losinsky, **1826.**
Heterodyne Exciter : see Frequency-Control.
Investigation of Electromagnetic **Hollow Spaces.**—Müller, **1379.**
Generation of Rectangular **Impulses.**—Miyoshi, **564.**
Electrical Stability of Tubular **Inductance** Coils with Deposited Conductors.—Thomas, **2965.**
Radioelectric Oscillations by Triode with **Insulated Grid** [probably Relaxation Oscillations of about 250 Mc/s].—Fortrat & Caravel, **71.**
Insulation : see Spark-Over.
Inverted Amplifier [Advantages for Short & Ultra-Short Waves].—Strong, **4242.**
Inverted Amplifier : see also Amplifier, Portable.
Inexpensive Electronic **Key.**—Grammer, **2969.**
" Bug " **Keys** [Lateral-Movement Morse Keys].—Roberts, **977.**
Electronic **Keying.**—Beecher, **2562.**
Counting Words per Minute Electrically [**Keying** Speed].—Larsen, **3377.**
Simple Calculations of **Klystron** Efficiency.—Condon, **3779.**
Causes of Frequency Variations in **Klystron** Oscillators.—Ginzton, **3778.**
Ultra-Short-Wave Generator with Phase-Focusing (**Klystron**).—Lüdi, **3777.**
Resonant Frequency of a Type of **Klystron** Resonator.—Smith, **3365.**
Theory of **Klystron** Oscillations.—Webster, **968.**
Klystron : see also Electronic-Generation, Velocity-Modulated, and under " Valves & Thermionics."
Impedance Characteristics of Tapped Resonance-**Line** Circuits.—Willshaw, **3368.**
Resonant Impedance of Transmission **Lines.**—Mergaard & Salzberg, **74.**
Action of **Magnetic** Field on Electrons of Oscillating Triodes [and Improvement in Efficiency of Ultra-Short-Wave Oscillators].—Copin, **1373.**
Magnetron.—Bellustin, **1812** (Whole-Anode M. neglecting Space Charge) ; Bethenod, **543** (Variation of Space Current under Action of Magnetic Field) ; Blewett & Ramo, **2953** (Behaviour of Space Charge rotating in Magnetic Field) ; Ford, **1809** (M. Oscillator with Compound Field Winding) ; Harvey, **969** (Cut-Off Characteristic) and **1811** (Impedance in Different Regions) ; Heller, **970** (Analysis of Electron Motion) ; Hollmann, **544** (Ultradynamic Lissajous' Figures : Analysis of M. Oscillations) ; Jänke, **541** (Internal Behaviour by Measurement of External Excitation) ; Katzman & Rubina, **542** (Calculation of Static Characteristic) ; McPetrie & Ford, **1808** (Experimental Investigation of Resonance & Electronic Oscillations) ; Möller, **2954** (Theory of Four-Slit M.) ; Moullin, **1372** (Effect of Space Charge) ; Nakamura & Hoshina, **2955** (Amplitude Modulation : Grid-Magnetrons) ; Okazaki, **1807** (Currents induced by Moving Charges) ; Seibert, **2543** (Acceleration of Charged Particles) ; Spiwak & Zrebny, **1810** (Cut-Off Curve, and Influence of Magnetic Field on Electron Motion). See also Transit-Time.
Microphone Polarity : see Polarity.
Method of Loading **Micro-Wave** Generators.—Morita, **2952.**
" Portable Five " **Midget** Transmitter with 5 Watts Output [Crystal-Controlled].—Sutter, **561.**
Linear **Modulation** Four-Terminal Network.—Akiyama, **4227** & **4228.**
Note on **Modulation** [with Reference also to Super-Regeneration, Circuits with Varying Parameter, etc.].—Brainerd, **2959.**
Metal **Modulator** of Shunt and Series Type [for Single-Sideband], *and* Modulation Loss of Ring **Modulator.**—Degawa, **2962.**
Differential **Modulation** Meter.—Gunsolley, **2555.**
Steep-Slope Suppressor-Grid **Modulation :** New Modulating System utilising Negative Transconductance of Pentode.—Hayasi & Isahara, **550.**
Modulation Circuit Theory [applicable to Amplitude, Phase, or Frequency Modulation].—Jaffe, **3371.**
Various Representations of **Modulation.**—Mühlbacher : Ruprecht, **1821.**
Electronic Valves as Controlled Switching Devices [Production of Very Deep Distortionless **Modulation**].—Vecchiacchi, **1386.**
Modulation : see also Amplifiers, Cathode-Modulation, Frequency, Magnetron, Oscilloscope, Phase, Polarity, Pre-Emphasis, Scintillation, Selective-Sideband.
Monitoring of Broadcasting Transmitters [Equipment at Sottens Station], **2228.**
Neutralisation of Radio-Frequency Power Amplifiers.—Doherty, **2558.**
Neutralising Economy : Taking D.C. off Neutralising Condenser.—Hansen, **2559.**
Versatile Oscillator—**Numans** Circuit : RF, AF, and Saw-Tooth Generator.—Cocking, **3792.**
Oscillations : see Electronic, Parasitic, Plasma, Positive-Grid.
Continuously Variable **Oscillator** for Parallel-Line Measurements at 100 to 1000 Megacycles.—King, **4241.**
Tuned-Grid Tuned-Plate **Oscillator.**—Mouromtseff, **4244.**
Oscillators : see also Book-Review, Crystal, Frequency-Stability, Hardening, Numans, Pierret, Ultra-Short.

Transmission—

Oscillatory Circuit with Small Losses.—Bunimovich, **1380.**
Oscillatory Circuits : see also Bands, Coaxial, Endovibrator, Gang-Tuned, Retarded-Retroaction, Tank.
Analysing Some Common Troubles with **Oscilloscope** Patterns [of Modulation].—Ferrill, **80.**
Parasitic Oscillation as By-Product of Mixer Process in Frequency-Changer Valves, and Practical Utilisation as Generator of Ultra-Short Waves.—Sargrove, **971.**
Theory of **Parasitic Oscillations.**—Nevyazhski, **81.**
Typical Phenomena relating to Ultra-Short-Wave **Pentode** Amplifier Circuits.—Posthumus & Gehrels, **3780.**
Pentodes on Short Wavelengths.—Albricht, **557.**
Employment of Amplifying Valve as Element of Variable Impedance [for **Phase Modulation,** etc.].—Chireix, **2956.**
Experimental Researches on **Pierret** Oscillator.—Bullini, **1375.**
Influence of Control Grid in **Plasma** on Mercury Vacuum Arc.—Fetz, **2549.**
Investigation of **Plasma** Oscillations in Sodium- and Mercury-Vapour Lamps.—von Stengel, **2550.**
Periodic Extinction and Control of Mercury-Vapour Arc by Grids in **Plasma.**—Wehner, **2548.**
Effect of Microphone **Polarity** on Percentage Modulation.—Hathaway, **548.**
Lop-Sided Speech and Modulation : Voice-Wave **Polarity** and Effect on 'Phone Transmitter Operation.—Grammer, **1820.**
Different **Portable-**Emergency Transmitter : Simplified Design with " Inverted " Amplifier.—Austin, **3384.**
Portable : see also Broadcasts, Midget, SOS, Transceivers.
Extended Wavelength Spectrum of Oscillations in Triode with **Positive Grid.**—King, **3367.**
High Frequency **Pre-Emphasis** [adopted for Sound Channel in Television].—Hathaway, **547.**
Pulses : see Impulses, Square-Wave.
Another Approach to High Power : **Push-Pull-Parallel** Operation of Medium-Voltage Tubes.—McCullough, **1825.**
Quartz Crystals : Piezoelectric Properties and Use in Control of High Frequency.—Baldwin, **2967** & **3382.**
Piezo-Oscillators with Neutralisation of **Quartz** [with Special Advantages at Very High Frequencies].—Boella, **553.**
Quick Building-Up of Electron-Coupled **Quartz** Oscillator.—Hayasi & Akasi, **552.**
Low-Temperature-Coefficient **Quartz** Crystal, *and* New GT **Quartz** Crystal with High Frequency-Constancy over Wide Temperature-Range.—Mason, **1819** & **3381.**
Quartz Crystals : see also under " Measurements & Standards."
" Wired Wireless " for **Remote Control** [of Distant Transmitter].—Williams, **1827.**
Theory of **Retarded Retroaction** [including Application to Micro-Wave Oscillators].—Gorelik, **540** & **1824.**
Measurement and Calculation of Oscillation Amplitude of **Retarding-Field** Generator.—Schwarz, **539.**
Retarding-Field Generator.—Kleinsteuber, **1374.**
Scintillation [Carrier-Frequency Fluctuation due to Amplitude Modulation].—Koike, **974.**
Television Detail and **Selective Sideband** Transmission, *and* Asymmetric-Sideband Broadcasting.—Goldman : Koomans, **549.**
Selective Sideband Transmission in Television.—Kell & Fredendall, **3376.**
Short-Wave Telegraphy Transmitter Type KVC 1.5/14, **559.**
Oscillation Frequency and Tuning in Externally Controlled **Single-Circuit** Transmitters.—Buschbeck, **1816.**
Influence of Filter Shape-Factor on **Single-Sideband** Distortion.—Wilson & Wheeler, **3375.**
Raft Radio : Automatic **SOS Transmitter, 2230.**
Influence of **Space Charge** on Focusing of Cathode Rays.—Reusse & Ripper, **3366.**
Radio-Frequency **Spark-Over** in Air.—Ekstrand, **556** & **3799.**
Generation of **Square-Wave** Voltages at High Frequencies.—Fenn, **563** & **3793.**
Multi-Stage **Standing-Wave** Circuits [with Application to Frequency Stabilisation and Acoustics].—Okabe, **3782.**
Single-Control Wide-Range **Tank** Circuit [4 : 1 Range by Ganged Combination].—Ferrill, **86** & **562.**
Papers on **Transceivers, 2561.**
New **Transit-Time** Devices [Velocity-Modulated " Drift Tubes "].—Hollmann, **2222.**
Theory of **Transit-Time** Oscillations [Retarding-Field & Magnetron Oscillations].—Lüdi, **3776.**
Safety Kilowatt **Transmitter :** Some Ideas in High-Power Transmitter Construction.—Bishop, **85.**
160 to 2½ [Metres] in One **Transmitter :** Medium-Power Seven-Band Final and Driver.—Tilton, **2560.**
Long-Wave C.W. **Transmitter** Type KSVC 20/11, **3798.**
Radio Progress during 1939 : Part IV—**Transmitters** and Antennas, **2971.**
Automatic **Tuning** for Amateur Transmitter : Mechanical Alignment for All Types of Circuit Lay-Outs.—Atkins & Read, **4251.**
Ultra-High-Frequency Power [1 kW at 600 Mc/s].—Sloan & Marshall, **3781.**
New **Ultra-High-Frequency** Transmitters [Frequency-Modulation and Television].—General Electric, **1381.**
Triode Oscillators for **Ultra-Short** Wavelengths.—Ratsey : Gavin, **72.**
Ultra-Short-Wave Transmitters for Multiplex Telephony.—Yonezawa & Tanaka, **4243.**
Ultra-High, -Short : see also Beam-Tubes, Bibliography, Cavity, Electron(ic), Electron-Motion, Endovibrator, Energy, Hollow-Spaces, Insulated-Grid, Inverted, Klystron, Line, Magnetic, Magnetron, Micro-Wave, Oscillator, Parasitic, Pentode, Pierret, Positive-Grid, Quartz, Retarded (ing), Transmitter, Velocity-Modulated, Very. Also under " Valves & Thermionics."
Current-Flow Characteristics in **Velocity-Modulated** Valves.—Geiger, **2950.**
Wave Energy and Transconductance of **Velocity-Modulated** Electron Beams.—Hahn, **537.**
Corrections to " Small-Signal Theory of **Velocity-Modulated** Electron Beams."—Hahn, **538.**
Ballistic Models of **Velocity-Modulated** Transit-Time Devices.—Hollmann, **2544.**
Velocity-Modulated Electron Beams in Crossed Deflecting Fields.—Kockel & Mayer, **2218.**
Velocity-Modulated Beams.—Kompfner, Strachey, Clavier, Tombs, **1805, 1806, 2545/7,** & **2949.**
Electronic Valve with **Velocity Modulation.**—Bethenod, **1377** & **3364.**
Electronic-Wave Theory of **Velocity Modulation** Tubes.—Ramo, **69** & **1378.**
Velocity Modulation : see also Klystron, Transit-Time.
Some Electronic and Electrical Measurements at **Very High** Radio Frequencies [Experiments with Variable Grid/Plate Distance].—Chipman, **2217.**
Questions of Intensity in Region of **Very Short** Electric Waves [10 mm–0.1 mm].—Klumb, **2542.**

RECEPTION

Sets for **Active Service** [Demand for Suitable Receivers], **1004.**
Adjacent-Channel Rejection : Means of securing Extreme Selectivity.—R.C.A., **4257.**
Visual **Alignment** Generator.—Mayer, **2570.**
Various " All-Dry " Receivers, **1010, 2240, 3001, 3826,** & **3827.**
" All-Dry " Receivers : see also " Double Decca " & " Twin Miracle " under Broadcast Receivers, and see also Portable.
Receiver **Amplification** of Wide Frequency Bands (Aerial Amplifiers) : Use of Valves in Parallel.—Alsleben, **89.**
High-Gain **Amplifier** for 150 Megacycles.—Rodwin & Klenk, **3801.**
Complete 56-Mc/s I.F. System : **Amplifier** for Use with either Frequency or Amplitude Modulation.—Goodman, **2564.**
Choosing Capacity of Tuned Circuits in designing Superheterodyne **Amplifiers.**—Chistyakov, **1840.**
Amplifiers : see also Noise, Phase-Inversion.
Effect of **Antenna Circuit** upon Frequency Characteristic of Regeneration.—Kanazawa, **4258.**
Reception of Broadcast Signals subject to Disturbance by **Atmospherics.**—Moore, **1391.**
Non-Stationary Processes in Receivers with **Automatic Tuning.**—Siforov & Glitshov, **3820.**
Automatic Tuning Correction : see Frequency-Control, Negative, Variable-Impedance.
Automatic Volume Control : see A.V.C., Q.A.V.C.
Design Problems in **Automobile** Radio Receivers.—Hall, **1005.**
Automobile : see also Car.
A.V.C. Developments : Using a Subsidiary RF Automatic Gain Control.—Cocking, **991.**
A.V.C. Characteristics and Distortion : Graphical Analysis of Valve Operating Conditions.—James & Biggs, **98.**
Some Circuits for Inter-Station Muting and Audio **A.V.C.**—Watson, **2996.**
Building-Up Processes in Broadcast **Band-Filters.**—Gensel, **2987.**
Band-Spreading : Effect on " Tuning Rate."—Woodbridge, **4259.**
Band-Spreading : see also Converter, Short-Wave.
Electrical **Band-Width** Control by Alteration of Amplification of Variable-Mu Valves.—Boucke, **569.**
Hydrogen-Filled Iron-Wire Ballast Lamp [**Barretter**].—Cole & Dalzell, **995.**
Bass Compensation by Screen-Grid Injection [" Syncrotronic " System].—Barcus, **3819.**
B.B.C. Receiving Station : Some Recent Developments.—Griffiths, **1001.**
Combined **Beat Oscillator** and I.F. Amplifier [adding C.W. Reception].—McConnell, **1400.**
Generation and Reception of Centimetric and Decimetric Radio Waves, 1934/1939 [**Bibliography**], **88.**
Blind : see Servicing.
" ' Pro Radio ' Jahrbuch 1938 " [Suppression of Interference : **Book Review**], **2238.**
" Wireless Servicing Manual, 5th Edition " [**Book Notice**].—Cocking, **3399.**
" Mallory-Yaxley Radio Service Encyclopedia " [**Book Review**], **3829.**
" Introduction to Frequency Modulation " [for Service Men : **Book Review**].—Rider, **3807.**

Reception—

"Servicing by Signal Tracing," *and* "Radio Service Trade Kinks" [**Book Reviews**].—Rider: Simon, **1847.**
"Moderne Kurzwellen-Empfangstechnik" [Short- & Ultra-Short-Wave Receiving Technique: **Book Review**].—Strutt, **2975.**
"Superheterodyne Receiver: Fourth Edition" [**Book Review**].—Witts, **2999.**
"Die Radiostorungen als Rechtproblem" [Interference as Legal Problem: **Book Review**].—Zurbrügg, **1837.**
Bootleg Catcher [used by F.C.C.], **4266.**
Broadcast Receivers for a Blitzkrieg, **3390.**
Rationalising **Broadcast** Receivers.—Sargrove, **3389.**
Broadcast & Communication-Type Receivers.—See "All-Dry" & "Portable," and: Bush Model PB63, **1011**; Cossor Models 34, 47, & 77, **3828,** and Model 71B, **1849**; "Double-Decca" (AC/DC & All-Dry), **3392**; G.E.C. Model 4010, **1009**; Hallicrafters "Skyrider" (Communication-Type), **1849**; Kolster-Brandes (for Export), **3391**; H.M.V. Model 1200, **1010,** and Models 1351 & 1404, **2241**; Marconiphone Models 895 & 911, **3823** & **3824**; Murphy Short-Wave "Specials," **3002**; Murphy Overseas Models, **3391,** and Model A92 "Stationmaster," **3826**; Murphy A90, **2242**; "Navigator-Globe" Radio, **3825**; Peto-Scott "Trophy 6" (Communication-Type), **1011**; Philips Models 805A, **3000,** and 855X, **1009**; Pilot "Twin Miracle" (AC/DC & All-Dry), **576**; Pye "International" 906, **575.**
Broadcast: see also Atmospherics, Band-Filters, Diversity, Emergency, Fading, Selectivity, Single-Valve.
Input **Capacitance** of Triode Oscillator [Trouble in Superheterodyne Receivers].—van Slooten, **1842.**
Compensating Tube-Input-**Capacitance** Variation [when Gain is Varied].—Farrington, **1843.**
Short-Wave Auto Radio [particularly Philco **Car** Receiver Model AR9, up to 12.1 Mc/s].—Herzog, **3822.**
Car: see also Automobile.
Cathode-Coupling: see Detector.
New Joining Method for Fixing of Metal Parts to **Ceramic** Bodies.—Osenberg, **1403.**
Communal Distribution and Local Transmitter, **2237.**
Communal, Community: see also Interference.
Checking and Overhauling **Communication** Receivers, **3830.**
General-Purpose **Communication** Receiver.—Green & Rudd, **2997.**
Communication Receivers: see also Broadcast, Superheterodyne.
Shape of Characteristic Curve of Rotating **Condenser** and Its Influence on Synchronism.—Pitsch, **2235.**
Radio Receiving Sets with Linear-Action Tuning **Condensers** [for Press-Button Tuning].—Gradstein, **1006.**
Conversion Dead Points of Converter in Receiver.—Seki, **2993.**
Superheterodyne **Converter** System Considerations in Television Receivers.—Herold, **1389.**
Practical 112-Mc/s **Converter** using Loktal Tubes for U.H.F. Mixer and Oscillator.—Goodman, **2563.**
Acorn-Tube 112-Mc **Converter.**—Rehm, **3387.**
Bandspread Short-Wave **Converter** [New System], **1841.**
Low-Frequency **Converter**: 500 to 3300 Metres on Communications Receiver.—Woodward, **4265.**
Converters: see Vibrator.
Corona in Oil as Part of Commercial-Frequency Circuit.—Kimura & others, **3396.**
Cross Modulation: Effects in Different Stages of Receiver: Cure, **3817.**
Behaviour of **Crystal** Detectors with Very Short Electromagnetic Waves.—Klumb & Koch, **87.**
Observations and Investigations on **Crystal** Detectors.—Klumb, **978.**
Three-Electrode **Crystals** with Barrier Layers [Short Survey].—Makovski, **1845.**
Quantitative Carrying-Through of Space-Charge and Border-Layer Theory of **Crystal** Rectifier.—Schottky & Spenke, **2976.**
Crystal Control of Mixer Oscillator in Superheterodyne Receiver.—Benson, **990** & **2992.**
Deaf-Aid Adaptor for Use with Standard Broadcast Set.—Wallace, **571.**
New Improvement: "Mixed-Retroaction" **Detection,** strictly Linear in Amplitude and Frequency.—Glorie, **100.**
Simultaneous **Detection** of Two Modulated Signals of Different Intensities and Largely Different Frequencies, when Inertia of Detector is taken into Account.—Loshakov, **2978.**
Selective **Detection.**—Momot, **2977.**
Notes on Diode **Detection.**—Preisman, **4255.**
"Infinite Impedance" **Detector**: Some Uses of Cathode-Coupling in Superheterodyne Receivers, **99.**
Behaviour of Diode **Detector** to Signal Modulated in Amplitude and Phase.—Cocci, **566.**
Second-**Detector** Circuit using 6H6 Diode in Voltage-Doubling Connection.—Towle, **1844.**
Detection, Detectors: see also Crystal, Emergency, Frequency-Modulated.
Die Castings in Parts Production.—Chase, **1402.**
Subjective Effect of **Disturbing Signals** in Telephone Circuits.—von Susani & Schöbel, **1395.**
"**Diversity**" in South Africa: Receiving European Signals for Re-Broadcasting [Panorama Station], **1838.**
Double Frequency-Changing: Application to Ultra-Short-Wave Reception.—Heightman, **2973.**
Drift: see Frequency-Stability.
Economising in H.T. Consumption: Anode Current dependent on Volume, **992.**
Emergency Receiver [without Any Form of Power Supply: New Type Westector in place of Crystal], **1003.**
Are **Expanders** Necessary?—Govyadinov, **570.**
Volume **Expansion** with Triode.—McProud, **4261.**
Selective **Fading** in Short-Range Broadcast Reception.—Alsleben: Feldtkeller & Mayer, **998.**
Fading of Broadcast Reception produced by Moving Railway-Trains.—Oxenfart, **999.**
Fading (Man-Made): see also Ultra-High.
Principles of **Fault-Tracing.**—Cazaly, **3003, 3398,** & **3831.**
Use of **Feedback** at Audio Frequencies.—Kotlov, **94.**
Feedback: see also Negative, and under "Properties of Circuits."
Frequency-Changing: see Conversion, Converter, Double, Noises.
Frequency Control by Thermionic Valves.—Weitzenmiller, **2233.**
Frequency-Metering Receivers.—Latmiral, **2991.**
First **Frequency-Modulation** Radio Receivers for High-Fidelity Reception, **91.**
Reception of **Frequency-Modulated** W1XOJ in England, **979.**
Frequency Modulation and Interference [Editorial Comment], **3809.**
Frequency-Modulation Limiter Performance: Operating Conditions for Weak-Signal Reception.—Browning, **4253.**
Frequency Modulation [Vectorial Representation of Effect of Noise].—Chaffee, **1828.**
Service Range of **Frequency Modulation.**—Crosby, **1390** & **3619.**
Artificial-Lightning Plant used to test Interference-Proof Performance of **Frequency Modulation.**—General Electric, **3808.**
Frequency-Modulation Receivers: Design and Performance.—Hobbs, **4252.**
Narrow-Band *versus* Wide-Band in **Frequency-Modulation** Reception.—Levy, **3803.**
Detection of **Frequency-Modulated** Oscillations.—Milstein, **2231.**
Papers on Noise and Interference in **Frequency-** & Phase-**Modulation** Systems.—Maeda: Pollack, **3386.**
Principles of **Frequency Modulation** and Application to Transmitters and Receivers.—Roberts, **3806.**
Wide-Range Ultra-High-Frequency Receiver: Circuit Features of **Frequency-Modulation**/Amplitude-Modulation Receiving System.—Schor, **3805.**
Frequency-Modulation Receiver Design.—Shea, **3804.**
Interference Reduction with **Frequency Modulation** as Function of Amplitude Limitation.—Zuhrt, **90.**
Frequency Modulation: see also Amplifier, Book-Review, and under "Transmission" and "Stations, Design & Operation."
Ultra-High-Frequency Oscillator **Frequency-Stability** Considerations [Drift in U.H.F. Receivers].—Seeley & Anderson, **3802.**
Gain-Control of Radio-Frequency Amplifiers: Effect on Input Admittance.—Lockhart, **4260.**
Gain-Control: see also Automatic, Capacitance.
Ganging: see Condenser, Superheterodyne.
Water Tubing as Receiver **Ground.**—Handa, **3007.**
Currents **induced** in Wires by High-Frequency Electromagnetic Fields.—Alford, **2983.**
Input Admittance, Capacitance: see Capacitance, Gain-Control.
New Method for Measurement of Discharges on Porcelain **Insulators.**—Arman, **986.**
Researches on Deposit of Dew on **Insulators** of Overhead Lines.—Cuilhé, **1394.**
Testing of Transmission-Line **Insulators** under Deposit Conditions.—John & Clark, **103.**
Behaviour of High-Voltage **Insulators** in Investigation of Broadcast Interference.—Miller, **1835.**
Fundamental Electrical and Mechanical Tests on "Long-Rod" **Insulator** of Porcelain.—Obenaus, **985.**
Improved Radio-Proof **Insulator.**—Ohio Brass Company, **2569.**
Introduction to "Guiding Rules for Testing of Overhead H.T. **Insulators** in Conditions of Fog and Dirt."—Weicker, **984.**
Interference.—**4264** (with Service Radio); Swiss Committee, **2236** (Incomplete Suppression at Source: Communal Aerial Systems recommended); **3814** (Data: E.R.A. Reports List); **3810** (Effect of Suppressors on Engine Performance); **3815** (Identified at Thousands of Miles); **982** & **983** (Razors). Also Aggers, **2986** (Methods of Controlling); Attwood & Cole, **1830** & **2982** (Suppression & Effect on Car); Bligh & Proctor, **3813** (Propagation, Suppression); Bloch, **2985** (Null-Point Device); Blok, **981** (Combating I.); British Standard Specification, **3395** & **4263**; George, **2981** & **3811** (Field Strength of Ignition I.); Glas, **3812** (Series Motors); Halpern, **1836** (Testing of Distribution Arresters); Isoré, **1393** (Legal Control); Kinross, **3816** (Methods applicable to Receiver); Kreuzritter, **1834** (from Lifts); Moebes, **2568** (Communal Aerial for I. from H.T. Lines); Murphy, **1829** (Car I. & the M. Noise-Limiting Circuit); Scholz & Faust, **980** & **2980** (Ignition I.); Sinclair, **104** & **1833** (from Trolleybus); Turney, **2567** (in Block of Flats). See also Book-Review, Communal, Corona, Disturbing-Signals, Frequency-Modulation, Induced, Insulators, Lamps, Lines, Noise.
Inter-Station Muting: see A.V.C.

Reception—

Investigation of Plasma Oscillations in Sodium- and Mercury-Vapour **Lamps.**—von Stengel, **2566.**
Considerations on Some Incidents of Service in High-Tension Overhead **Lines.**—Pernier, **3397.**
Public **Listening** [Obstacles preventing Dissemination of News & Speeches].—Gulliland, **1002.**
Problems of H.F. Design, *and* Reduction of **Losses** in Short-Wave Receivers.—Russell, **4254.**
Connection of Several **Loudspeakers** to Receiver.—Wünsch, **3004.**
New **Materials** in Mass Production of Radio Apparatus.—Efrus, **106.**
Paper on Parasitic Oscillation as By-Product of **Mixer** Process.—Sargrove, **989.**
Mixer-Oscillator : see Crystal.
On learning **Morse :** Psychological Process in Two Distinct Stages.—Raven-Hart, **3832.**
High-Frequency **Negative Feedback** in Band-Filter Receivers, **93.**
Negative-Feedback : see also Feedback, Selectivity.
Reactances with **Negative Inductive or Capacitive** Characteristics.—Vilbig, **2994.**
Neutralising Screened-Grid Valves [in Specially Good Circuits]—Stokes, **3818.**
Valve and Circuit **Noises :** Designing RF and Frequency-Changer Stages for High Signal/Noise Ratio, **2234.**
Instruments and Methods of Measuring Radio **Noise** [Coordination Committee].—Aggers, Foster, & Young, **1832.**
"Modified" Dickert **Noise** Limiter: Circuit particularly adapted to Mobile Applications.—Hill, **2565.**
Experimental Investigation of Characteristics of Certain Types of **Noise.**—Jansky, **1392.**
Internal **Noise** of Receivers and Amplifiers.—Klemt, **988.**
Noise Disturbance in Broadcast Audio-Frequency Band.—Kono, **987.**
Series **Noise** Limiter with Plate Detectors.—Rafford: Bacon, **102** & **2979.**
Noise : see also Frequency-Modulation, Interference, Pre-Selector.
British Radio Exports: Remarkable **Overseas** Demand stimulated by Stringent Testing during Production, **573.**
Panoramic Reception [for Navigation, etc.].—Wallace, **3385** & **3800.**
Effect of **Phase Character** in Receiver upon Modulated Wave.—Morita, Seki, **4256.**
Use of **Phase-Inversion** Circuits in L.F. Amplifiers of Radio Receivers.—Govyadinov, **97.**
Phase-Modulated : see Detector.
Plasma Oscillations : see Lamps.
Standards for **Plug-and-Socket** Devices for Broadcast Receiver Installations.—VDE, **577.**
Portable Receivers.—Pilot, **576 ;** Mix, **1851** (Compact Battery Receiver) ; Denco "Pocket Two," **1852 ;** H.M.V., Marconiphone, & G.E.C. "All-Dry" Ps., **1853 ;** Cocking, **2239** (Valves at Low Voltages: Operating Conditions for Headphone Portable) ; "Mulparvo" Ps., **3393 ;** H.M.V. Model 1406 Portable, **3827.** See also Active-Service, All-Dry, Emergency, Single Valve.
Regeneration in **Pre-Selector :** Theoretical Investigation of Possibilities of Image Rejection and Gain.—Browning, **1396.**
Regenerative **Pre-Selector** with Output-Metering Bridge [High Protection against Noise].—Talen, **1831.**
Simplified **Push-Button** Tuning.—Crosley, **1848.**
Simplifying **Push-Button** Tuning: Condenser with 60-Degree Rotation.—Torotor Company, **2989.**
Push-Button : see also Condensers.
Q.A.V.C. using Relay ["Squelch" Circuit], **4262.**
Smooth **Reaction :** Avoiding "Ploppiness" and Backlash, *and* **Reaction** Refinements: Effects of Aerial, R.F. Amplifier, and A.F. Load, **993.**
Reaction : see also Retroaction.
Special Points in **Receiver** Circuits of 1939/40 Season.—Saic, **574.**
Radio Progress during 1939: Radio **Receivers, 2998.**
Receivers : see also Active-Service, Bass-Compensated, Battery, Broadcast, Communication, Cossor, Economising, Emergency, Frequency-Metering, Frequency-Modulation, Marconiphone, Overseas, Panoramic, Portable, Remote-Control, Selectivity, Short-Wave, Superheterodyne, Super-Regenerative, Tests, Tuning.
L.T. to H.T. Vibrators with Synchronous **Rectification.**—Semenov, **107.**
Remote Control of Rotary Switches.—Rudd & Craig, **2990.**
Remotely Controlled Radio Receiver.—McKennie, **1399.**
Remotely Controlled Radio Receiving Systems.—Mossman & others, **2232.**
Effect of **Retroaction** on Tuning [Editorial], **95.**
Retroaction : see also Antenna-Circuit, Feedback, Pre-Selector.
Simplified Multiple **Scale** for Measuring Instruments and Radio Receivers, **3821.**
Selectivity Measurement and Selectivity Requirements in Broadcast Receivers.—Moebes, **997.**
Intermediate-Frequency **Selectivity** in Receivers for Commercial Radio Services.—Moore & Moore, **1397.**
Increasing **Selectivity** of Modern Receiver by High-Frequency Negative Feedback.—Nowak, **568.**
Selectivity : see also Adjacent-Channel, Band-Width, Phase-Character, Pre-Selector.
Instrument enables Blind to do Radio **Servicing.**—Barany, **1846.**
Servicing : see also Book-Review, Communication, Fault-Tracing.
Short-Wave Reception: News-Gathering Conditions in Prospect and Retrospect, **1000.**
New Murphy Receivers [Mains and Battery **Short-Wave** "Specials"], **3002.**
Single-Dial Band Spread: **Short-Wave** Reception simplified by New System of Tuning, **1008.**
Radio Sets with Station Dials calibrated for **Short Waves** [Band Spread].—Heller, **1007.**
Short Waves : see also Converter, Losses, Single-Sideband.
Siemens-Hell Printer.—Berck, **2571.**
Single-Knob : see Superheterodyne.
Single-Sideband Short-Wave Receiver [for Two Speech Channels].—Gabriel, **1398.**
Single-Valve Sets: New Light on Old Circuits [including Reflex Circuits], **1850.**
Communications-Type **Superheterodyne** Receiver for 30–60 Mc/s Range.—National Company, **92.**
Development of **Superheterodyne** Receiver.—Renatus, **96.**
Single-Knob Tuning in **Superheterodynes** [including Short- and Ultra-Short-Wave Reception].—Santoro, **2988.**
Design of **Superheterodyne** Intermediate-Frequency Circuits.—Spaulding, **3388.**
Ganging **Superheterodyne** Receivers [Analysis leading to Approx. Formula].—Wald, **1839.**
Superheterodyne : see also Amplifiers, Book-Review, Capacitance, Condenser, Conversion, Converter, Crystal, Detector.
Linear Resonance Phenomena in **Super-Regenerative** Receiver.—Gorelik, **2972.**
Combined Resonance Phenomena in **Super-Regenerators.**—Osipov, **565.**
Switching-On the News: Automatic Time Switches for Mains and Battery Sets, **572.**
Reception of **Telegraphic Signals** ["Superiority" of C.W. Telegraphy over Tone Telegraphy is Not Inherent].—Builder, **567.**
Standardisation of **Tests** on Receivers, **1401.**
Adjustments and **Tests** in Mass Production of Radio Receivers.—Stepura, **105.**
Tests : see also Alignment, Servicing.
Causes of Corrugation of Overhead Conductor of Electric **Trams,** etc.].—Angström, **2984.**
Nomograms for Calculation of Mains **Transformers** in Low-Power Radiotechnical Apparatus.—Crescini, **3394.**
Effects of Hum-Bucking Construction and Magnetic Shielding in A.F. **Transformers.**—Fortune, **3006.**
Better Utilisation of **Transformers** with Tapping-Points.—Wünsch, **996.**
Variation of Self-Inductance of High-Frequency Coils by D.C. Magnetic Bias [for **Tuning**].—Maus, **994.**
Electric **Tuning** Indicators and Their Applications.—Tsarev, **101.**
Tuning : see also Push-Button, Remote-Control, Superheterodyne.
Brief Notes on Man-Made Variations in **Ultra-High-Frequency** Received Fields.—Hawkins, **2974.**
Ultra-High : see also Amplifier, Bibliography, Book-Review, Converter, Crystal, Double-Frequency-Change, Frequency-Modulation, Frequency-Stability, Superheterodyne, Super-Regenerative.
Employment of Amplifying Valve as Element of **Variable Impedance** [for A.T.C., etc.].—Chireix, **2995.**
New Type of D.C./A.C. **Vibrator** Inverter.—Kiltie, **3005.**
Vibrators : see also Rectification.
Volume Control : see Automatic, Gain.

AERIALS AND AERIAL SYSTEMS

Absorption of Radio Waves by Thin Water Shell [and Employment to Improve Directivity].—Morita, **3401.**
Absorption Surfaces : see Directive.
Acoustic Models of Radio Antennas.—Jordan & Everitt, **582.**
Free Space Propagation Measurements at 75 Megacycles [**Aircraft** Aerials].—Haller, **2245.**
Development of **Aircraft** Radio Antennas.—McGuire & Delmonte, **2578.**
All-Wave Aerials: Best Type for Present-Day Listening?—Strafford, **2251.**
All-Wave : see also Television.
Aerials of Radio-**Andorra** Station.—Adam, **1408.**
Radio Progress during 1939: Part IV—Transmitters and **Antennas, 3017.**
Antenna **Arrays** with Closely Spaced Elements ["Flat-Top Beam" Aerials].—Kraus, **1860.**
Model Three-Element **Beam** at Pacific-Southwestern Convention.—Bane, **114.**
Stationary Reversible **Beam.**—Stiles, **2575.**
Beam : see also Arrays, Corner, Directional, Directive, Reflector, Rotary, Wave-Canal.
Aerial Fed from Above [for **Broadcasting**].—Wiechowski, **118.**

Aerials and Aerial Systems—

Novel Features in WHAS (Louisville) **Broadcasting** Transmitter and Aerial System.—Doherty & Towner, **190.**

Broadcasting : see also Andorra, Fading, Radiation, Shunt, Tower, Vertical.

"S.I.C.E." **Cable** for High Frequencies, **2247.**

Cages : see Screening.

Captation, Surface of : see Dipole.

Car-Aerials : see Duplex, Radiation-Efficiency.

Central Antenna System [for Block of Flats, etc : Philips Antennaphil System].—Fruin, **588.**

Stacking **Coaxial** Antennas : Novel Four-Element Collinear Array for 56 Mc/s Work.—Sanders, **111.**

Coaxial : see Cable, Corona, Lines.

Communal Aerial as Means of Reducing Broadcast Interference from High-Voltage Lines.—Moebes, **2581.**

Communal Aerial : see also Central, and under "Interference" in "Reception."

Compensation : see Reactances.

Concentric : see Coaxial.

Corner Reflector [Beam System with Driven Element and Reflector of Two Flat Sheets].—Kraus, **109.**

Gaseous Ionisation and Surface-**Corona**-Discharge Detection at Low and High Frequencies.—Brown & Weston, **121** & **589.**

Improved Pi-Section Antenna **Coupler :** Simpler Alterations for Wider Impedance Range and Better Harmonic Reduction.—Jeffrey, **1412.**

Generalised **Coupling** Theorem for Ultra-High-Frequency Circuits [Parallel Lines].—King, **2244.**

Coupling : see Distributed, Progressive-Waves.

Study of Radiation from Horizontal **Dipole** mounted above Reflecting Surface.—Ashbel & Chernov, **1012.**

Surface of Captation of Half-Wave **Dipole.**—Rocard, **3844.**

Dipole : see Directive, Multi-Wire, Reflectors, Television.

Dipole, Elementary : see Hertz.

Directional Antenna Chart [showing Voltage Gain].—Duttera, **2576.**

Directional Reception : "Steerable" Short-Wave Aerial.—Leutz, **587.**

Design and Calculation of **Directive** Dipole Aerials.—Barzilai, **1407** & **3406.**

Gain and [Rüdenberg] "Absorption Surfaces" of Large **Directive** Arrays.—Franz, **2249.**

New **Directive** Aerial System [for Short and Ultra-Short Waves].—Pigge, **2246.**

Directional, Directive : see also Absorption, Receiving, Rotary, Steerable, Triangle.

Application of Low-Frequency Circuit Analysis to Problem of **Distributed Coupling** in Ultra-High-Frequency Circuits.—King, **581.**

Duplex Operation on Single Aerial [e.g. for Use of Car Aerial not only for Transmission but also for Reception].—Builder, **1018.**

Efficiency : see Radiation.

Electromagnetic Field : see Field.

Energy : see Radiating.

Factors affecting Anti-**Fading** Properties of Aerials for Radio Broadcasting.—Braude, **1861.**

Hyperbolic Angle of **Feeder** for Short-Wave Antenna, and Applications.—Kato, **1019.**

Feeders : see also Cable, Matched, Matching, Micro-Wave.

Electromagnetic **Field** of Spherical Oscillator excited by Electromotive Force.—Arenberg, **1857.**

Calculation of Driving-Point Impedance in Electromagnetic **Field** Problems.—Stratton & Chu, **3404.**

Field : see also Phase-Structure, Progressive-Wave.

Folded-Dipole : see Television.

Large **Frame** Aerial for Small Receiver by Wires woven into Shoulder Strap, **2252.**

Frame : see also Screened.

Effect of Antenna Circuit upon **Frequency Characteristic of Regeneration.**—Kanazawa, **4273.**

Water Tubing as Receiver **Ground.**—Handa, **3021.**

Laws of Radiation of Electromagnetic Waves in Hollow Ultra-Short-Wave **Guides** of Rectangular Cross-Section.—Buchholz, **2243.**

Guides : see also Wave-Guides.

Radiation Resistance of **Hertz** Oscillator.—Arenberg, **1014.**

Self-Induction and Capacity of **Hertz** Vibrator and Equivalence to Closed Oscillatory Circuit.—Arenberg, **1015.**

Distribution of Energy of Elementary [**Hertz**] Oscillator.—Arenberg, **1858.**

Biconical Electromagnetic **Horns.**—Barrow, Chu, & Jansen, **1404.**

Multi-Unit Electromagnetic **Horns.**—Barrow & Shulman, **3008.**

Movement of Electromagnetic Waves in Cone-Shaped **Horn.**—Buchholz, **3009.**

Metal **Horns** as Radiators of Electric Waves.—King, **2573.**

Horns : see also Radiation, Wave-Guides.

Impedance : see Field, Lines.

Induced Radiation Resistances over Large Distances.—Fradin, **115.**

Currents **induced** in Wires by High-Frequency Electromagnetic Fields.—Alford, **3012.**

Consideration of Radio-Frequency Voltages encountered by **Insulating Material** of Broadcast Tower Antennas.—Brown, **119.**

Insulation of Vertical-Mast Radiators.—Savitski, **3847.**

British Standard Specification for Anti-**Interference** Characteristics and Performance of Radio Receiving Equipment, **3408.**

Ionospheric Research : see Vertical.

Improving the Flying Skywire [**Kite Aerial**].—Griffin, **2579.**

Note on **Laguerre Polynomials.**—Howell, **3841.**

Input Impedance of Parallel-Wire Transmission **Lines** immersed in Absorbing Medium.—Banerjee, **3403.**

Exponential Transmission **Line** [for Matching Purposes].—Burrows, **1862.**

Vibration of Overhead **Line** Conductors.—Double & Tuck, **1864.**

Measurement of Transmission Constants of Concentric **Lines** in Decimetric-Wave Region.—Kaufmann, **2574.**

Sag Measurement on Overhead **Lines.**—Naumann, **2580.**

Resonant Impedance of Transmission **Lines.**—Nergaard & Salzberg, **122.**

Curves for Overhead **Lines** with Suspension Points of Different Heights.—Niethammer, **1413.**

Mechanical Calculation of Conductors of Overhead Electric **Lines** —Silva, **3020.**

Lines with Non-Uniformly Distributed Parameters.—Volpert, **3835.**

Lines : see also Corona, Matching, Moisture, Transmission-Lines.

Ultra-High-Frequency **Loop** Antennae.—Alford & Kandoian, **3011.**

Horizontally Polarised Waves and Wide-Band **Loop** Antennas.—R.C.A., **3839.**

Loop : see also Screened.

Erection of 220 ft Wireless **Mast,** 3019.

Mast : see also Insulation, Tower.

T-**Matched** Antenna : Feeding Radiator with Untuned Line.—Kraus & Sturgeon, **4270.**

R.F. **Matching** Network for General Use : Simplified Matching of Lines of Different Impedances.—Andrew, **123.**

Use of Coupled Parallel-Wire Systems for **Matching** between Ultra-Short-Wave Aerial and Feeder.—Usui, **4269.**

Matching : see also Coupler, Line, Multi-Wire.

Method of Loading **Micro-Wave** Generators.—Morita, **3010.**

Models : see Acoustic.

Effect of **Moisture** on Transmission Lines.—Barber, **1854.**

Multi-Wire Dipole Antennas.—Kraus, **2577.**

Multi-Wire : see also Micro-Wave.

Limitations of **Musa** Systems due to Scattering in E Region.—Eckersley, **3015.**

Manahawkin **Musa** [for London Service : Sixteen Rhombic Units].—Oswald, **1410.**

Single-Sideband **Musa** Receiving System for Commercial Operation on Transatlantic Radio-Telephone Circuits.—Polkinghorn, **116** & **3016.**

Overhead Line : see Line.

Paraboloid : see Reflectors.

Parallel Lines : see Coupling, Line, Matching.

Investigation of **Phase Structure** of Electromagnetic Field in Vicinity of Transmitting Antenna.—Alpert, Migulin, & Rjazin, **1405.**

Electromagnetic Radiation from **Point Sources.**—Fradin, **1856.**

Portable Kinks : Useful Circuit and Antenna Ideas.—Dreyer, **3409.**

Electric and Magnetic Fields of Linear Radiator carrying **Progressive Wave.**—Colebrook : Lewin, **1859** & **3013.**

Radiation Coupling of Straight Linear Skew Conductors for **Progressive Waves.**—Jachnow, **585.**

Progressive Waves : see also Travelling.

Quantic Emission in Phase in Region of Radioelectric Waves.—Jonescu, **2572.**

"Bound" Energy of **Radiating** Wire.—Kesseníkh, **2250.**

Radiation Efficiency of Aerial Systems.—Babin, **1016.**

Direct-Reading Field-Intensity Meter for Measurements of **Radiation** from Broadcast Antennas.—Christiansen, **583.**

General **Radiation** Formula [for Power radiated in Non-Dissipative Media].—Schelkunoff, **108** & **3842.**

Radiation : see also Dipole, Point-Sources, Quantic-Emission, Radiation-Efficiency, Travelling, Vertical.

Radiation Efficiency of Aerial Systems.—Babin, **1406.**

Increasing the **Radiation Efficiency** at Low Frequencies [around 3 Mc/s].—Morgan, **4272.**

Radiation Resistance of Spherical Oscillator excited by External Electromotive Force.—Arenberg, **3405.**

Radiation Resistance : see Hertz, Induced.

Compensation of Aerial **Reactances** of Television Transmitters.—Labus, **110.**

Space Directive Characteristics of Single-Wire **Receiving** Antennas.—Miya, **4274.**

Receiving Aerials [Factors in designing Aerials to give Low Interference Level].—van Slooten, **1020.**

Receiving Aerials : see also All-Wave, Frame, Kite, Loop, Musa, Portable.

General **Reciprocity** Theorem for Transmission Lines at Ultra-High Frequencies.—King, **3402.**

Experimental Study of Parabolic Wire-**Reflectors** on about 3 Metres.—Dutta, Chakravarty, & Khastgir, **579.**

Dipoles and **Reflectors** for Ultra-Short Waves : Review.—Goldman, **3840.**

Aerials and Aerial Systems—

Electromagnetic Field of Paraboloid-of-Revolution **Reflectors.**—Wwedensky & Maizels, **1013.**
Reflectors : see also Corner, Laguerre-Polynomials, Ultra-Short.
Rhombic : see Musa.
Link Coupling for **Rotary** Antenna : Three-Element Beam with Continuous Rotation.—Burke, **113.**
Fixed **" Rotary "** Beam Antenna : Variable Directivity with Fixed Antennas.—Lynch, **3848.**
Replacement of Main Aerial System at **Rugby** Radio Station.—Hollinghurst & Mann, **3018.**
Screened Frame Aerials : Wrong and Right Ideas about How They Reduce Interference, **3014.**
Dangerous Catch Phrases [applied to **Screened** Aerials].—Scroggie : Green, **1863** & **2253.**
Screened Loop Aerial : Theoretical and Experimental Investigation. —Burgess, **117.**
Screening Effect of Wire Cages.—Kontorovich, **3407.**
Screening : see also Interference, Receiving-Aerials.
Short-Wave : see Acoustic, Directional, Feeder, Radiation-Efficiency, Tower, Ultra-Short, Vertical.
Current Distribution and Radiation Properties of **Shunt-**Excited Antenna.—Baudoux, **3846.**
Experimental Comparison of **Shunt-** and Series-Excitation of High Vertical Radiator.—MacKinnon, **1017.**
Simplified **Shunt** Feeding.—Bauer, **586.**
Single-Sideband : see Musa.
Calculation of **Skin-Effect** by Method of Perturbations.—Rytov, **4271.**
Forced Oscillations of **Spherical Oscillator** in Circular [Magnetic] Flux.—Arenberg, **3845.**
Spherical Oscillator : see also Field, Radiation-Resistance.
Experiments on **Steerable** Antenna.—Takeuchi, **1021.**
Steerable : see also Directional.
Television Receiving Antennas and Transmission Lines.—Barber, **1854.**
Simple **Television** Aerials.—Carter, **580.**
Antennas and Transmission Lines at the Empire State **Television** Station.—Lindenblad, **3837.**
Combined **Television** and All-Wave Sound Aerial.—R.C.A., **3838.**
Top Feed : see Broadcasting.
Tuning of **Tower** Aerials [Stacked-Dipole Aerials of Moscow Short-Wave Station].—Ruschuk, **584.**
Transmission Lines : see Feeders, Line, Matching, Reciprocity, Television.
Radiation from Conductors carrying **Travelling** Current and Voltage Waves.—Nadenenko, **3843.**
Triangle Antenna : Selecting Directivity with Non-Rotatable Aerial.—Arnold, **1411.**
Propagation of Waves inside Cylindrical Metal **Tube** and along Other Types of Guides.—Pen [Hsu], **3834.**
Turnstile Array : see Television.
Ultra-High-Frequency Antenna of Simple Construction.—Brown & Epstein, **3836.**
Simple Antennas and Receiver Input Circuits for **Ultra-High** Frequencies.—Holmes & Turner, **4268.**
More Thoughts on Effective Antennas [for Short & **Ultra-Short** Waves].—Lynch, **112.**
Aerial and Reflector System for **Ultra-Short** Waves, to withstand High Winds and Snow.—Matsumae & others, **4267.**
Ultra-Short-Wave Aerial Systems : Characteristics and Designs.—Strafford, **1855.**
Ultra-Short : see Absorption, Acoustic, Aircraft, Cable, Coaxial-Antenna, Corner, Coupling, Directive, Distributed, Horns, Induced, Interference, Lines, Loop, Matching, Micro-Wave, Reactances, Reciprocity, Reflector, Television, Wave-Canal, Wave-Guide.
Vertical Aerial for Special-Event Broadcasting [Comparison with Doublet Aerial].—Langham, **1409.**
Special Aerials for **Vertical** Radiation for Ionospheric Research.—Lejay, **2248.**
Water Shell : see Absorption.
Design of **" Wave Canal "** with Active Radiators.—Fradin, **578.**
Research on **Wave Guides** and Electromagnetic Horns.—Morimoto, Sonada, **3400** & **3833.**
Wave-Guides : see also Guides, Horn, Skin-Effect, Tube, and under " Propagation of Waves."
Wide-Band : see Loop.

VALVES AND THERMIONICS

Activation : see Molybdenum, Oxide-Coated.
Theory of **Adsorption** on Square Lattices.—Roberts, **4290.**
Adsorption : see also Book-Review, Tungsten.
" All-Dry " Valves [Some Osram Types], **2276.**
All-Dry : see also Miniature.
Amplification Factor : see Single-Grid.
Choosing Optimum Operating Conditions for Final Stage of L.F. **Amplifier,** taking into Account Non-Linearity of Valve Characteristics.—Krize, **3871.**
Amplifier : see also Harmonic-Voltage, Inductive-Output, Secondary.
Anode Effect as Function of Temperature.—Copeland, **1427** & **3034.**
Arc : see Mercury-Vapour.
Papers on the **Augetron** and Photo-Augetron, **2256, 3854, 3855,** & **4281.**
Thermionic Emission, Migration, and Evaporation of **Barium** on Tungsten.—Becker & Moore, **2264.**
Production of **Barium** and Use in Vacuum Technique.—Gvozdov, **159.**
Quantitative Study of Clean-Up of Hydrogen by **Barium,**—Johnson, Hane, & Anderson, **626.**
Recent Advances in **Barium** Getter Technique.—Lederer, **1433.**
Barium : see also Contact-Potential, Emission, Gettering.
Battery Receivers : see All-Dry, Miniature.
Type 257 Gammatron [**Beam** Pentode of Unusual Design], **1876.**
Beam Tubes as Ultra-High-Frequency Generators.—King, **132.**
Limiting Current Densities in Electron **Beams.**—Pierce, **1419.**
Rectilinear Electron Flow in **Beams.**—Pierce, **3424** & **4275.**
Beam : see also Mixer, Space-Charge, Transmitting, Velocity-Modulated.
Benedicks Effect : see Thermoelectric.
" R.C.A. Tube Data Handbooks " [**Book Review**], **4280.**
" Theory and Applications of Electron Tubes " [Reply to **Book Review**].—Reich, **151.**
" Some Problems in Adsorption " [**Book Review**].—Roberts, **4289.**
Camera : see Electron-Diffraction.
Measuring Valve **Capacities** with Signal Generator.—Hygrade Sylvania, **3873.**
Recent Improvement in Filamentary **Cathodes.**—R.C.A. Laboratories, **3865.**
Fourth-Power Law for Determination of Emissivities of Sleeve-Type **Cathodes** and Working Formula.—Widell, **3862.**
Cathode : see also Composite, Oxide-Coated, Secondary, Work-Function, X-Ray.
Cathode-Ray Tube : see Inductive-Output, Testing.
Currents *in Vacuo* between **Coaxial Cylinders.**—Bellustin, **597.**
Emission of Electrons from **" Cold "** Metallic Targets with High-Energy Positive-Ion Bombardment.—Fisk, **621.**
Emission from **Composite Cathodes** under Simultaneous Electron Bombardment and Illumination.—Borzyak, **2260.**
Composite Cathode : see also Secondary.
Contact Difference of **Potential** between Barium and Zinc : External Work Function of Zinc.—Anderson, **2267.**
Contact Potential : see Anode-Effect, Work-Function.
Influence of " Cold Ends " on Performance of Vacuum-Tube Air **Coolers.**—Mouromtseff, **3877.**
Water and Forced-Air **Cooling** of Vacuum Tubes with External Anodes, *and* Large Air-**Cooled** Tubes in 50-Kilowatt Transmitters.—Mouromtseff, Moran, **3033** & **3434.**
Air **Cooling** applied to External-Anode Tubes.—Ostlund, **3876.**
Extremely Bright Spots on **Coolidge Tube** Target [due to Electron Bombardment of Minute Protrusions].—Koga & Tatibana, **140** & **594.**
Recent Experiments on Thermionic Properties of Different **Crystal** Directions of Same Metal, **4288.**
Crystallographic : see Tungsten.
Current Division in Plane-Electrode Triodes.—Spangenberg, **598** & **3417.**
New Valve for generating **Decimetric** Waves.—Tsvetkovski & Dzhibelli, **124.**
Some Notes on Diode **Detection.**—Preisman, **4285.**
Behaviour of Diode **Detector** to Signal Modulated in Amplitude and Phase.—Cocci, **600.**
Superheterodyne First-**Detector** Considerations in Television Receivers.—Herold, **139.**
Detector : see also Rectifier.
Dielectric : see Emission, Secondary.
Diffusion of Hydrogen from Water through Steel.—Norton, **4291.**
Diode Operating Conditions.—Court, **154.**
Diode Operating Conditions [particularly Positively Biased Régime]. —Sturley : Court, **1877.**
Theory of Thermionic **Diode.**—Wheatcroft, **3028.**
Diode : see also Detector, Rectifier, Transit-Time, Ultra-High.
Distortion in Valves with Resistive Loads : Graphical Methods for Determination.—Bloch, **608.**
Distortion : see also Harmonic-Analysis, Single-Grid.
Investigation of **Dynatron** Hysteresis at Low Frequencies.—Copeland & Kubert, **3425.**
Efficiency : see Harmonic-Voltage, Klystron.
Measurements of Potential [and Plotting of Electron Paths] by **Electrolytic** Tank.—Hepp, **1027.**
New Design of **Electrolytic** Trough for Determination of Potential Fields.—Himpan, **3032.**
Electrolytic Method of studying Electrostatic Fields.—Lukoshkov, **1880.**
Measurements by **Electrometer Triode** [Philips Type 4060].—Thaes, **601.**
Electrometer Triode and Applications.—van Suchtelen, **1879.**
Electron : see Emission, Free-Path, Magnetic, Transit-Time, and below.
Electron Beams : see Beams, Space-Charge.

Valves and Thermionics—

Design and Performance of **Electron Diffraction** Camera.—Ruedy: R.C.A., **3429.**
Electron Gas : see Magnetic.
Electron Motion : see Electrolytic, Induced, Magnetic-Field, Magnetron, Potential, Space-Charge.
Production of Low-Voltage Secondary-**Electron Multipliers** with Copper/Sulphur/Caesium Layers.—Badikova: Kubetski, **3428.**
Mode of Action of **Electron Multiplier** [of "Pendulum" Type]. Orthuber & Recknagel, **2257.**
Residual Current in Electrostatic **Electron Multipliers.**—Rajchman, **142.**
Electrostatic **Electron Multiplier.**—Zworykin & Rajchman, **141.**
Electron-Multipliers : see also Coolidge-Tube, Secondary.
Thermionic Measurement of e/m.—Gager, **3867.**
Optimum **Emission** from Solid Solution of BaO and SrO at Particular Composition, and Explanation.—Uehara & Takahasi, **3864.**
Electron **Emission** into Dielectric Liquids.—LePage & DuBridge, **3869.**
Maintenance of Electron **Emission** in Cossor Valves after L.T Supply is Disconnected.—Pandya & Pathak: Narasimhaiya, **2598.**
Emission : see also Cold, Composite-Cathodes, Crystal, Field, Positive-Ion, Schottky-Line, Secondary, Thermoelectric, Uranium.
Energy Exchange : see Velocity-Modulated.
Equivalent Electrostatic **Circuits** for Vacuum Tubes.—Dow, **3418.**
Observations on **Field** Currents from Tantalum.—Fleming & Holtoner, **3868.**
Validity of **Field**-Current Equations.—Abbott & Henderson, **622.**
Fields involved in **Field** Emission.—Henderson & MacKenzie, **623.**
Explanation of Directional Variation of **Field** Emission as Interference Phenomenon in Metal Lattice.—Müller, **1428.**
Field Emission : see also Tungsten.
Filaments : see Fusing.
Films : see Molybdenum, Silver, and under "Subsidiary Apparatus & Materials."
Small **Fluctuations** in Space-Charge-Limited Electron Current from Fine Tungsten Wire.—Berry & Varney, **3421.**
Fluctuations in Space-Charge-Limited Currents at Moderately High Frequencies.—Thompson: North, **1421, 3420,** & **3861.**
Mean **Free Path** in Gases contained in Vessel.—Saito, **596.**
Frequency-Changing : see Ultra-High.
Fusing of Incandescent Tungsten Filaments *in Vacuo* and in Inert Gases.—Voznesenskaya & Soustin, **614.**
Gammatron : see Beam.
Gas-Filled Tetrode and Its Important Possibilities.—Windred, **4279.**
Gases : see Micro-Analysis.
Investigation into **Gettering** Powers of Various Metals for Gases Hydrogen, Oxygen, Nitrogen, Carbon Dioxide, and Air.—Ehrke & Slack, **1885.**
Gettering : see also Barium.
Glass : see Strain-Analyser.
How to figure **Grid-Bias** Requirements.—Selvidge, **155.**
Harmonic Analysis by Method of Central Differences.—Espley, **3872.**
Power-Tube Performance as influenced by **Harmonic Voltage.**—Sarbacher, **3433.**
Four Tiny Pentodes for **Hearing Aids** [$1\frac{1}{4}$" Long, $\frac{1}{2}$" Diam.].—Raytheon, **2593.**
Hysteresis : see Dynatron.
Hytron : see Ultra-High.
Induced Currents in Split Cylindrical Electrodes by Moving Charges, *and* Electrostatic Fields inside Split Circular Cylindrical Electrodes.—Okazaki, **3412.**
Currents **Induced** by Electron Motion.—Ramo, **131.**
Induced Currents : see Magnetron.
Wide-Band **Inductive-Output** Amplifier [10 Watts at 500 Mc/s].—Haeff & Nergaard, **128** & **3023.**
RCA 825 **Inductive-Output** Amplifier [Cathode-Ray-Type for Ultra-Short Waves], **4277.**
Initial Velocities : see Diode, Space-Charge, Tube.
Papers on **Input Capacitance** of Valves.—van Slooten: Farrington, **1878.**
Input Conductance Neutralisation [at Ultra-High Frequencies].—Freeman, **599.**
Input Conductance : Measurement in High-Slope H.F. Amplifier Valves [at 37 Mc/s].—Preisach & Zakarias, **2255.**
Effect of **Input Impedance** of Valve on Frequency Characteristic of Tuned Amplifier.—Chistyakov, **156.**
Insulators : see Secondary.
Ion, Ion-Bombardment, Ionised : see Cold, Magnetic, Positive-Ion.
Theory of **Klystron** Oscillations.—Webster, **1022.**
Klystrons at Stanford University [Photographs only], **2584.**
Simple Calculations of **Klystron** Efficiency.—Condon, **3850.**
Klystron : see also Transit-Time, Velocity-Modulated.
Determination of Average **Life** of Vacuum Tubes.—Gannett, **4284.**
Vacuum-Tube **Life** Probability *versus* Consumer Satisfaction.—Parker, **1432.**
Life : see also Repeater.
Use of **Loktal** Valves in Ultra-Short-Wave Converters.—Goodman **2587.**
Loktal-Tube Design and Manufacture.—Wise, **3880.**
Loktal : see also Manufacturing.
Properties of Electron Gas in **Magnetic** Field [by Quantum Theory].—Achieser, **1024.**
Action of **Magnetic Field** on Electrons of Oscillating Triodes [at Ultra-Short Wavelengths].—Copin, **1415.**
Acceleration and Average Cross Drift of Electrons in **Magnetic** Field.—Smith, **3410.**
High-Frequency Conductivity of Ionised Medium in Presence of External Transverse **Magnetic** Field.—Singh & Sinha, **3411.**
Influence of **Magnetic Field** upon Electron Motion in Axially Symmetrical Fields.—Spiwak & Zrebny, **1867.**
Study of Whole-Anode **Magnetron** neglecting the Space Charge.—Bellustin, **1871.**
Variation of Space Current in **Magnetron** under Action of Magnetic Field.—Bethenod, **593.**
Magnetron Oscillator with Compound Field Winding.—Ford, **1868.**
Internal Capacity and Resistance of **Magnetron.**—Hara, **1414.**
Impedance of **Magnetron** in Different Regions of the Frequency Spectrum.—Harvey, **1870.**
Papers on **Magnetron** Valves.—Jänke: Katzman & Rubina, **592.**
Bolometers for Measurements in **Magnetron** Investigations.—Klumb, **2586.**
Anode-Tank-Circuit **Magnetron.**—Linder, **591.**
Experimental Investigation of Resonance and Electronic Oscillations in **Magnetrons.**—McPetrie & Ford, **1869.**
Paper on Induced Currents in **Magnetron** Anodes.—Okazaki, **1872.**
Electrostatic Field and Capacitance between Split Anodes of **Magnetron.**—Omoto & Morita, **4276.**
Partial-Split-Anode **Magnetron** [for Very Short B-Type Waves].—Owaki, **3024.**
Acceleration of Charged Particles in Alternating-Current Field [in **Magnetrons**].—Seibert, **2585.**
Magnetron Cut-Off Curve [and Importance of Energy of Random Motion].—Spiwak & Zrebny, **1866.**
Magnetrons : see also Coolidge-Tube, Induced-Currents, Space-Charge, Transit-Time, Tube.
Recent Changes in Radio-Tube-**Manufacturing Technique** [particularly Loktal Types].—Wise, **2273.**
Materials for Vacuum Tube Manufacture.—Monack: R.C.A., **3882.**
Measurement : see Signal-Handling, Test.
Periodic Extinction and Control of **Mercury-Vapour Arc** by Grids in Plasma [at Note and Radio Frequencies].—Wehner, **2589.**
Micro-Analysis of Gases by Physical Methods.—Ransley, **3883.**
Microscope : see Thoriated-Tungsten.
Development and Production of New **Miniature** Battery Tubes.—R.C.A.: Smith & Schooley, **604, 1431,** & **3436.**
Miniature : see also Hearing-Aids, Repeater.
Principle of New Beam **Mixer** Valve Type 6K8G, **3881.**
Models, Tests on : see Similarity-Laws, Transit, Velocity.
Heating of Thin **Molybdenum** Films in High-Frequency Electric Field.—Wright, **3437.**
Molybdenum-Thorium Activation.—Nelting, **4287.**
Molybdenum : see Thoriated.
Multi-Electrode : see Coaxial-Cylinders.
Nature of Particles emitted from **NaCl** when irradiated with Electrons.—Vudynski, **2261.**
Velocity Distribution of Secondary Electrons emitted from **NaCl.**—Vudynski, **2262.**
Neutralisation : see Input-Conductance, Screened-Grid, Space-Charge, Thoriated-Tungsten.
New Valves : see Decimetric, R.C.A., Receivers, Transmitting, Types, Valve-Data.
Grid-Induction **Noise** in Vacuum Tubes at Ultra-High Frequencies.—Ballantine, **3026.**
Noise : see also Fluctuations, Shot.
Non-Stationary : see Perturbation.
Zone Model of **Oxide** Cathodes.—Uehara & Takahasi, **3863.**
Properties of **Oxide-Coated** Cathodes.—Blewett, **1028.**
Oxide-Coated Cathode [Theory, Manufacture, and Investigation with Electron-Microscope].—Te Gude & Theile, **1029.**
Oxide-Coated : see also Emission, Semiconductor.
Oxygen : see Tungsten.
General Considerations on **Pentode** Valves for Wireless Transmitters.—Warnecke, **1422.**
Pentodes : see also Beam, Hearing-Aids, Short, Ultra-.
Some Theorems of **Perturbation** Theory, and particularly on Application in Theory of Non-Stationary Processes in Electronic Valves.—Grünberg, **3415.**
Further Researches on **Photoelectric** Effect in Metals at High Temperatures.—della Corte: Ricca, **1429.**
Hallwachs **Photoelectric** Effect in Metals at High Temperatures.—Deaglio, **1882.**
Oscillographic Method of measuring **Positive-Grid** Characteristics.—Livingston, **3874.**
Direct-Viewing Method for **Positive-Grid** Characteristics [without Damage to Valve].—Sawada & Kameyama, **607.**

Valves and Thermionics—

Positive Ion Emission from Nickel.—Jarvis, **2268.**
Positive Ions : see also Space-Charge.
Distribution of [Steady-State] **Potential** in Cylindrical Thermionic Valves.—Crank, Hartree, Ingham, & Sloane, **1420.**
Potential : see also Electrolytic-Tank.
Interesting Range of **Power Amplifier** Valves, ranging between 10 and 250 Watts.—Philips, **4282.**
Radio **Progress** during 1939 : Part II—Electronics, **3027.**
New Method of **Rating** Transmitting Tubes, **158.**
Rationalising Broadcast Receivers [for "Total War" Plan].—Sargrove, **3435.**
New **RCA** Valves [Types 6K8 and RCA-957, 958, & 959].—Brailo, **157.**
Modern Valves for Radio **Receivers.**—Levitin, **665.**
Applications of Voltage-Doubler **Rectifier** [Extended Use of Double-Diode].—Honnell, **1423.**
Contribution to Theory of Diode **Rectifier.**—Oplustil, **3416.**
Characteristics of Thermionic **Rectifiers** at High Voltage.—Miyazaki, **3423.**
New Type of Vacuum Tube [**Repeater** Valve with Very Long Life : Question of Application to Broadcast Receiver Valves].—Western Electric, etc., **603, 2274,** & **2592.**
"D-157654"—a Megacycle **Repeater** [Miniature Pentode].—Western Electric, **2591.**
Retarding-Field : see Transit-Time.
Periodic Deviation from **Schottky** Line.—Mott-Smith : Seifert, Turnbull, Phipps, **617** & **618.**
Calculation of Transmission Coefficients and Explanation of Periodic Deviations from **Schottky** Line.—Mullin & Guth, **2596.**
Additional Experimental Evidence of Periodic Deviation from "**Schottky** Line."—Nottingham, **3035** & **3430.**
Note on **Schottky** Effect [Tests discriminate between Formulae of Schottky and Gill].—Wheatcroft, **1883.**
Neutralising **Screened-Grid** Valves.—Stokes, **3870.**
Osram Variable-Mu **Screened Tetrode** KTW73M, **4283.**
Secondary-Emission Amplifier Valve with Screen-Grid Characteristics, **3856.**
Secondary Electron Emission : Influence of Externally Adsorbed Ions and Atoms on Secondary Emission of Metals.—de Boer & Bruining, **148.**
Energy Distribution of Low-Temperature **Secondary** Electrons.—Bojinesco, **149.**
Production of **Secondary** Electrons by High-Energy Electrons.—Fowler & Sheppard, **610.**
Secondary Emission from Films of Silver on Platinum.—Hastings, **2595.**
Direct Measurement of **Secondary** Electron Output from Insulators.—Heimann & Geyer, **2594.**
Emission of **Secondary** Electrons and Charging Phenomena at Insulators.—Hintenberger, **146.**
Theory of **Secondary-**Electron Emission from Metals.—Kadyschewitsch, **3030.**
Properties of Effective [**Secondary-**Electron] Emitters.—Khlebnikov, **609.**
Determining Charging Potential of Dielectrics and Lower Limit of **Secondary** Electron Emission from Monocrystal of NaCl.—Kirvalidze, **3857.**
Secondary-Electron Emission under Action of Two Electron Beams.—Kushnir & Milyutin, **144.**
Secondary Electron Emission from Mercury.—Kushnir, Milyutin, & Goncharov, **2263.**
Nature of **Secondary** Emission from Composite Cathodes, *and* **Secondary** Emission from Thin Dielectric Layers.—Morgulis : Korshunova & Khlebnikov, **1424.**
Dependence of **Secondary** Emission on Primary Current.—Morgulis, **3858.**
Field-Enhanced **Secondary** Electron Emission.—Nelson, **2258.**
Secondary Electrons and Secondary-Electron Multipliers.—Peter, **143.**
Secondary Electron Emission of Tungsten, Copper, and Iron at High Voltages.—Rakov & Antonov, **1425.**
Secondary-Emission Valves as Amplifiers.—Saic, **1026.**
Secondary-Emission Factor of Electron-Irradiated Insulators.—Salow, **1881.**
Secondary-Electron Emission of Pure Metals in Unordered and Ordered State, *and* Influence of Adsorbed Oxygen on **Secondary-**Electron Emission of Pure Metals at 83° and 293° Abs.—Suhrmann & Kundt, **150.**
Mechanism of **Secondary** Electron Emission.—Suhrmann & Kundt, **611.**
Mechanism of **Secondary** Emission of Electrons from Composite Surfaces.—Timofeev, **3427.**
Secondary-Electron Emission from Thin Dielectric Layers.—Vudynski, **145.**
Theory of **Secondary** Emission [Quantum-Mechanical Treatment].—Wooldridge, **147.**
Secondary Emission from Evaporated Nickel and Cobalt.—Wooldridge, **1426.**
Temperature Effects on **Secondary** Emission from Pure Metals.—Wooldridge, **3426.**
On **Secondary** Electron Emission.—Yasnopol'ski & Tyagunov, **2259.**
Secondary Emission : see also Augetron, Dynatron, Electron-Diffraction, Electron-Multiplier, NaCl, Similarity-Laws, Temperature-Effects.
Electroconductivity of **Semiconductors** at High Temperatures [with Bearing on Oxide-Coated Cathodes].—Schulman, **612.**
Pentodes on **Short** Wavelengths.—Albricht, **602.**
Short Wavelengths : see also Triode.
Short [and Ultra-Short]- Wave Valves : Advantages of Specialised Types.—Henderson, **1023.**
Campbell's Theorem and Application to Theory of **Shot** Effect.—Rowland, **2269.**
Signal-Handling Capacity of H.F. Valves : Method of Measurement.—Sloane, **152.**
Signal/Noise : see Detector.
Contact Difference of Potential between **Silver** Films on Glass and Rocksalt.—Anderson, **625.**
Silver : see Secondary.
Similarity Laws in Theory of Electronic Valves.—Oertel, **3029.**
Inconstancy of "Durchgriff" and Cubical Distortions of **Single-Grid** Valves.—Holzwarth, **1025.**
Correspondence on Zeitlenok's Paper "Effect of **Space Charge** in Valve on Velocity of Electrons."—Bellustin, Kovalenkov, **125.**
H.F. Behaviour of **Space Charge** rotating in Magnetic Field, *also* Theory of Four-Slit Magnetron, *and* Amplitude Modulation of Magnetron Oscillators, with Special Reference to Grid-Magnetrons.—Blewett & Ramo : Möller : Nakamura & Hoshina, **3025.**
Space-Charge Relations in Triodes, and Characteristic Surface of Large Vacuum Tubes.—Chaffee, **3031.**
Behaviour of **Space Charges** in High- and Ultra-High-Frequency Fields.—Güttinger, **1873.**
Space-Charge Effects in Electron Beams.—Haeff, **127.**
Mechanism of Electron **Space Charge** Neutralisation by Positive Ions.—Karr & Varney, **3422.**
Electronic **Space Charge** between Plane Electrodes, taking into Consideration Initial Velocity and Velocity Distribution of Electrons.—Strutt & van der Ziel, **126.**
Suggestions for Radio **Standardisation :** War Economy Measure proposed by British Institution of Radio Engineers.—Sargrove, **3878.**
Standardisation of R.C.A. Valves [Example for British Manufacturers], **2275.**
Standardisation : see also Rationalising, Types, Valve-Data.
Improved Glass **Strain Analyser** [using Polaroid Sheets], **160.**
Valve **Symbols** as used in *Wireless World* Circuit Diagrams, **2271.**
Tantalum : see Field-Currents.
Television Reception and Television Receiving Valves, **1874.**
Temperature Distribution surrounding Some Bodies heated Electrically.—Shimizu & Nishifuji, **4282.**
Special Issue on Measurement and Control of **Temperature, 4293.**
Temperature Effects in Secondary Emission, *and* Effects of Order and Disorder on Secondary Electron Emission.—Wooldridge, Hartman, **4286.**
Dynamic Valve **Test** Set.—Macfadyen & Day, **153.**
Testing Amplifier Output Valves by means of Cathode-Ray Tube.—van der Ven, **2270.**
Testing : see also Positive-Grid, Transmitting.
Tetrodes : see Gas-Filled, Screened, Ultra-High.
Critical Examination of Benedicks Homogeneous **Thermoelectric Effect.**—Ch'eng & Band, **615.**
Contribution to Thermoelectronic Study of **Thoriated Molybdenum.**—Grauwin, **1030.**
Neutralisation and Ionisation on **Thoriated Tungsten** Surface.—Morgulis, Bernadiner, & Djatlovitzkaja, **3036** & **3859.**
Surface Structure of **Thoriated Tungsten** examined by Ionic Microscope.—Morgulis, **3860.**
Electron **Transit Time :** Effects in Cathode-Ray Tubes and Diodes.—Benham, **595.**
New **Transit-Time** Devices : Survey.—Hollmann, **2254.**
Ballistic Models of Velocity-Modulated **Transit-Time** Devices.—Hollmann, **2582.**
Theory of **Transit-Time** [Retarding-Field & Magnetron] Oscillations, *and* Ultra-Short-Wave Generator with Phase-Focusing (Klystron).—Lüdi, **3849.**
Transmission-Coefficient : see Schottky.
New **Transmitting** Tube [Type 828 Beam Power Valve], **133.**
New **Transmitting** Tubes : HK257 Beam Tetrode : RCA 811 & 812 (with Zirconium-Coated Nickel Plates) : HY615 (up to 300 Mc/s), **1430.**
Measurement of **Transmitting** Valve Characteristics above Dissipation Limit.—Stolzer & Sargrove, **3875.**
Transmitting Valves : see also Cooling, Diffusion, Grid-Bias, Pentode, Positive-Grid, Rating, Test, Triode.
Note on "Calculation of **Triode** Constants."—Rodda : Fremlin, **3419.**
High-Power Transmitting **Triode** for Short Waves.—Warnecke & Bonne, **2272.**
High-Power Dual-Unit Transmitting **Triode,** Eimac 152TL, **2590.**

Valves and Thermionics—

Triodes : see also Current-Division, Electrometer, Magnetic-Field, Schottky, Single-Grid, Space-Charge, Ultra-.
Discussion on "Contribution to **Tube** and Amplifier Theory" [Neglect of Initial Velocities, etc.].—Benham : Pidduck, **129.**
Field Emission from **Tungsten** Single Crystals.—Daniel, **3431.**
Thermionic and Adsorptive Properties of Surfaces of **Tungsten** Single Crystal.—Martin, **619.**
New Method for Studying Adsorption of Gases at Very Low Pressures and Properties of Adsorbed Films of Oxygen on **Tungsten,** *and* Kinetics of Formation of Oxygen Films on **Tungsten.**—Morrison & Roberts, **613.**
Adsorption of Oxygen in **Tungsten.**—Morrison, **2265.**
Thermionic Constants of **Tungsten** as a Function of Crystallographic Direction.—Nichols, **2266.**
Electrolytic "Polishing" of **Tungsten.**—Peterson, Guarino, & Coomes, **3432.**
Tungsten : see also Barium, Fluctuations, Fusing, Photoelectric, Secondary, Thoriated, Work-Functions.
Tube Registry [Valve **Types** registered by R.M.A. Data Bureau], **3879.**
Ultra-High-Frequency Transmitting Triode, Hytron 75, **2588.**
Diode as Frequency-Changer for Measurements at **Ultra-High** Frequencies.—Gainsborough, **134.**
Development of 20-Kilowatt **Ultra-High-**Frequency Tetrode for Television Service.—Haeff, Nergaard, & others, **138.**
20 kW Tetrode for **Ultra-High-**Frequency Transmitters.—Haeff & others, **1875.**
Ultra-High-Frequency Push-Pull Transmitting Pentode.—R.C.A., **4278.**
Ultra-High-Frequency Power [1 kW Average Power at 600 Mc/s, using A.C. Anode Voltage].—Sloan & Marshall, **3851.**
Ultra-High-Frequency Push-Pull Pentode with 30 Watts Operating Anode Dissipation, Type 240 HH.—Western Electric, **3852.**
New **Ultra-High-**Frequency Tetrode and Use in 1-Kilowatt Television Sound Transmitter.—Wing & Young, **3414.**
Operation of Valves on Short [and **Ultra-Short**] Waves [and Method of Increasing Efficiency].—Gonorovski, **136.**
Typical Phenomena relating to **Ultra-Short-**Wave Pentode [PB 3/800] Amplifier Circuits.—Posthumus & Gehrels, **3853.**
Triode Oscillators for **Ultra-Short** Wavelengths.—Ratsey : Gavin, **135.**
Push-Pull Pentode [for **Ultra-Short** Waves].—Zusmanovski, **137.**
Ultra-High, -Short : see also Augetrons, Beam, Cathodes (Filamentary), Decimetric, Detector, Inductive-Output, Input-Conductance, Klystron, Loktal, Magnetic-Field, Magnetron, Noise, Short, Space-Charge, Television, Transit-Time, Transmitting, Velocity-Modulated.
Emissive and Thermionic Characteristics of **Uranium.**—Hole & Wright, **620.**
Discussion on "Present-Day Technique of **Vacuum** Apparatus for Very High Voltages."—Matricon, **2600.**
Modern **Vacuum** Practice in Electronics.—Morse, **627.**
Vacuum Seals for Metallic Ion and Electron Tubes.—Mashkov, **2601.**
"The Wireless World" **Valve Data,** 1940, **2277.**
Electronic Valve with **Velocity Modulation.**—Bethenod, **1416** & **3413.**
Current-Flow Characteristics in **Velocity-Modulated** Valves.—Geiger, **3022.**
Wave Energy and Transconductance of **Velocity-Modulated** Electron Beams *and* Corrections to "Small-Signal Theory of **Velocity-Modulated** Electron Beams."—Hahn, **590.**
Use of Ballistic Models for Study of Energy Exchange Conditions in **Velocity-Modulated** & Other Devices.—Hollmann, **1418.**
Electronic-Wave Theory of **Velocity Modulation** Tubes.—Ramo, **130** & **1417.**
Velocity-Modulated Beams : Electron Density Distribution.—Tombs, Kompfner, Strachey, **1865** & **2583.**
Velocity-Modulation : see also Induced, Klystron, Transit-Time.
Cathode-Ray Tubes free from "**Wheatcroft Effect.**"—Macfadyen : Cossor Company, **606.**
Temperature Variation of **Work Function** of Cathodes with Non-Uniformly Emitting Surface.—Gysae & Wagener, **2597.**
Thermoelectric Method for Determination of **Work Functions.**—Fleming & Henderson, **616.**
New Method for Measurement of **Work Functions.**—Goss & Henderson, **624.**
Work Functions : see also Anode-Effect, Contact-Potential, Oxide, Silver.
Applications of **X-Ray** Technique to Industrial Laboratory Problems [Cathode Coatings, Fluorescent Screens, etc.].—Rooksby, **2599** & **3866.**
Zirconium : see Transmitting.

DIRECTIONAL WIRELESS

Adcock : see Compensated-Loop, Polarisation.
Aerodrome Speaks and Hears [Budapest], **1896.**
Wireless Navigation in **Aeronautics.**—Leib, **2607.**
Radioelectricity in **Aeronautics.**—Laveran, **1895** & **3045.**
Development of **Aircraft** Radio Antennas.—McGuire & Delmonte, **2604.**
Aircraft : see also above, and Altimeter, Beacons, Blind-Landing, Book-Review, Cathode-Ray, Compass, Decimetric, Instrument-Landing, Mountains, Omnidirectional, Ultra-High.
Radio "Absolute **Altimeter.**"—Western Electric, **1892.**
Paper on Reflecting Power of Ground Surfaces, in connection with Acoustic **Altimeters.**—Ernsthausen & von Wittern, **1435.**
Altimeters : see also Sound-Absorbing.
Recording Radiogoniometer for **Atmospherics.**—Ranzi, **1031.**
Direction-Finding of Transients caused by **Atmospheric** Disturbances.—Schindelhauer, **633.**
Direction-Finding of Sources of **Atmospherics,** and South African Meteorology.—Schonland & Hodges, **2279.**
Radio Direction-Finding for Meteorological **Balloons** at 1.67 Metres.—Yuan & Mackeown, **3041** & **3884.**
Flying **Beacons** for Alaska [remotely controlled by Frequency-Modulated Transmitters].—C.A.A., **4296.**
Beacons : see also Diffraction, Mountains, Omnidirectional, Ultra-High, -Short.
Bearings : see Half-Convergency.
Blind Landing for Airplanes [Problem in Selecting Standard American System], **161.**
Development of Klystron Micro-Wave Generator, and Use for **Blind Landing.**—Boone, **1888.**
Blind-Landing : see also Decimetric, Indianapolis, Infra-Red, Instrument-Landing, Wave-Guides.
"Aircraft Radio and Electrical Equipment" [**Book Review**].—Morgan, **3046.**
"Die Sender und Sendeanlage der Reichsflugsicherung" [Circuits & Construction of Ground-Station Transmitters : **Book Review**].—Zetzmann, **1035.**
Cathode-Ray Tubes in Aircraft Instrumentation.—Carnahan, **162.**
Cathode-Ray Direction-Finders.—Henderson, **2280.**
Cathode-Ray : see also Atmospherics, Compass, Distance.
Closed-Loop : see Polarisation.
Contribution of Radioelectricity to Safety of Aerial Navigation : Radio **Compass** [Survey].—Bouchard : Busignies, **3044.**
Radio **Compass** giving Intersecting Traces, on Dual-Ray Cathode-Ray Tube, from Two Stations.—Dearing : R.C.A., **3887.**
Aircraft Radio **Compasses**—Principles and Testing [U.S. Army].—Framme, **163.**
Use of Cathode-Ray Oscillograph in Inductor Tele-**Compass.**—Goncharski, **3441.**
Radio **Compass** for Small Vessels.—Reichle, **1436.**
Design of Radio Receiving Equipment to meet Special Requirements [such as Radio **Compasses**].—Webb, **3043.**
Compasses : see also Mountains.
Performance and Limitations of **Compensated Loop** Direction-Finder.—Barfield, **3042.**
Decimetric Waves for Aviation [Demonstration at Airport : Klystron Oscillator & Horn Radiators], **628.**
Diffraction of Radio Ranges by Hills.—Haseltine, **2278** & **2605.**
Amateur D.F : Design of Simple **Direction-Finder.**—Black, **3440.**
Radio **Direction-Finding** on Wavelengths between 2 and 3 Metres (100 to 150 Mc/s).—Smith-Rose & Hopkins, **2602** & **4294.**
Direction Finding : see also Balloons, Cathode-Ray, Compass, Compensated-Loop, Panoramic, Position, and below.
Summary of Known Suggestions for Determination of **Distance** and for Reflected-Beam Direction Finding by Wireless Means, and Their Critical Consideration.—Dziewior, **630.**
Television Range-Finders [Size of Spot indicating **Distance**].—Goldsmith, **2281.**
Distance Meter [based on Optical Effect observed when passing Two Fences].—Lau, **2282.**
Measuring Phase Difference between Two Frequencies, particularly for **Distance** Determination by Interference.—Lyubchenko, **1034.**
Russian Papers on **Distance** Measurement, **1437** *bis.*
Application of Radio-Interference **Distance** Meters.—Schegolev **1893.**
Distance Measurements by Wireless, **3886.**
Distance Measurement : see also Instrument-Landing, Position, Velocity.
Errors : see Polarisation.
Fog : see Blind-Landing, Infra-Red.
Refinement of **Half-Convergency Correction.**—Baker, **3047.**
Horns : see Wave-Guides.
Indianapolis Landing System [CAA System] selected as "Standard," **1889.**
Development of Civil Aeronautics Authority Instrument-Landing System at **Indianapolis.**—Jackson, Alford, Byrne, & Fischer, **3038.**
Fog-Landing Equipment, Ball System, using **Infra-Red** Light and Television Scanning Technique, **2603.**
Aircraft **Instrument Landing** Research at Massachusetts Institute of Technology.—Bowles, **629.**
Manipulating the Micro-Waves [particularly Work of M.I.T. on **Instrument-Landing** System, Distance Determination, etc.].—Bowles, **3040.**
Instrument Landing System [C.A.A.–I.T. & T. System], **1434.**

Directional Wireless—

Symposium on "The CAA-MIT **Instrument-Landing** Research," **3037.**
Instrument-Landing : see also Blind-Landing, Indianapolis.
Klystron : see Blind-Landing, Decimetric.
Ultra-High-Frequency **Loop** Antennae.—Alford & Kandoian, **3039.**
Loop : see also Compensated, Polarisation.
M.I.T. see Instrument-Landing.
Air Electricity warns Planes when approaching **Mountains.**—Gunn, **4297.**
Effects of **Mountains** in Radiogoniometry and Combined Use of Radio Beacons and Radio Compasses for Aerial Navigation.—Busignies, **631.**
Mountains : see also Diffraction.
Radio in **Navigation** [Survey].—Tuska, **632.**
New **Omnidirectional** Radio Beacon.—Amisima, Okada, & Yonezawa, **4295.**
True **Omnidirectional** Radio Beacon.—Dingley, **166** & **1437.**
RCA "**Omnidirectional** Radio Range Beacon" for Aircraft.—Luck, **3439.**
Panoramic Reception [and Advantages for Navigation, etc.].—Wallace, **3385** & **3888.**
Errors in Closed-Loop Direction Finders caused by Abnormal **Polarisation.**—Cole, **164.**
Proposal for Reduction of **Polarisation** Errors in Loop Direction-Finders.—Terman & Pettit, **3889.**
Testing of Residual **Polarisation** Error of Adcock Direction-Finder Installations for Long Waves.—Wächtler & Gothe, **2608.**
Wireless **Position** Finding.—Runge, **2606.**
Radio-Interference Method for fixing **Position** of Ships.—Mescheriakov & Preobrajenski, **1894.**
Calculation of **Sensitivity** of Visual Radio Direction Finder.—Astaf'ev, **165.**
Sound-Absorbing Properties of Some Common Out-Door Materials [Gravel, etc.].—Kaye & Evans, **3442.**
British Standard Glossary of **Terms** used in Radio Direction-Finding, **1032.**
Impetus which Aviation has given to Application of **Ultra-High** Frequencies.—Jackson, **1890.**
On Direction Finder [Experiments on **Ultra-Short** Waves of about 5 m].—Nukiyama, Irisawa, & Kobayasi, **1891.**
Theoretical Considerations on Philips' **Ultra-Short-**Wave Radio-Beacon.—Zijlstra, **3885.**
Ultra-High, -Short : see also Balloons, Decimetric, Direction-Finding, Loop, Wave-Guides.
Measurements of Propagation **Velocity** of Electromagnetic Waves along Two-Wire Circuit in Inhomogeneous Medium.—Malov, **1033.**
Visual D.F. : see Sensitivity.
Research on **Wave Guides** and Electromagnetic Horns.—Sonada, **1886.**
H- and EH-Waves passing through Circularly Curved **Wave Guides.**—Sonada, Morimoto, & Ito, **1887.**

ACOUSTICS AND AUDIO-FREQUENCIES

Absolute Measurement of Sound without Primary Standard.—MacLean, **4335.**
Form and Propagation of Sound Waves in Space limited by **Absorbing** Surfaces.—Brillouin, **1079.**
Sound-**Absorbing** Properties of Some Common Out-Door Materials.—Kaye & Evans, **3461.**
Absorption and Diffraction of Sound by Small Areas of **Absorbing** Material.—Pellam, Bolt, **2630, 4345,** & **4346.**
Measurement of **Absorption** Coefficients and Application of Acoustical Absorbents : Symposium, **679.**
Absorption of Sound in Solids.—Akhieser, **1078.**
Effect of Paint on Sound **Absorption** of Acoustic Materials.—Chrisler, **3460.**
Absorption of Sound by Systems with Double Resonance.—Nesterov, **2629.**
Absorption : see also Amorphous-Bodies, Audiences, Cinemas, Glass-Surfaces, Horns, Impedance (**4341**), Interferometer, Noise, Resistance-Standard, Resonators, Room, Supersonic, Velocity.
References to Contemporary Papers on **Acoustics,** and Indexes to Volume Eleven of the *Journal*, **2647.**
Chats on **Acoustics.**—Brillouin & others, **1484.**
Practical Aspects of Architectural **Acoustics,** *and* Planning Functionally for Good **Acoustics.**—Knudsen : Maxfield & Potwin, **2635.**
Density of Energy in **Acoustic** Problems.—Sacerdote, **3068.**
Acoustic : see also Acoustical, Surveys.
Acoustic Properties : see Rayleigh-Principle, Rooms, Studios.
Twenty-Second Meeting of **Acoustical Society of America, 1483.**
Addresses at Meeting of **Acoustical Society of America, 665.**
"Cumulative Index, Volumes 1 to 10 of Journal of **Acoustical Society of America**" [Book Review], **3931.**
Measurements of Noise from **Aerofoils** and Streamline Wires.—Hilton, **4353.**
Radiation of Acoustic **Air-Jet Generator** derived from Direct Observation.—Hartmann & Lazarus, **2306.**
Air-Jet Generator : see also Book-Review.
Air-Raid Signal : see Sound-Equipment.
Phenomenological Theory of Mechanical Properties of **Amorphous Bodies.**—Frenkel & Obrastzov, **3085.**
Class B Audio-Frequency **Amplification.**—Gordon, **170.**
Amplification of Power at Acoustic Frequencies.—Pinciroli, **1901.**
Applications of Space-Charge Coupling [to Condenser-Microphone **Amplification**].—Sargrove, **3897.**
McClure Model ACA 16 **Amplifier :** 15-W Unit for A.C. Mains, **3454.**
C25 Acoustical **Amplifier :** Compact Unit suitable for Mobile Equipment, **3895.**
Construction of **Amplifier** for Collective Communications.—Beer & Tucker, **1048.**
Direct-Current and Audio-Frequency **Amplifier.**—Black & Scott, **3898.**
Load-Rating Theory for Multi-Channel **Amplifiers.**—Holbrook & Dixon, **647.**
14C Programme **Amplifier.**—Meyers, **4330.**
Universal Audio Broadcast **Amplifier** [High-Fidelity 12 Watt Output].—Sigmon, **2622.**
Phase-Shifting Device for Rapid Determination of Audio-Frequency **Amplifier** Characteristics.—Spangenberg & Palmer, **168.**
Electromechanical **Analogies.**—Bordoni, **3453.**
Industrial Stethoscope [Recording Frequency **Analyser**], **2640.**
Wave **Analyser.**—Marconi-Ekco, **1914.**
Degenerative Sound **Analyser.**—Scott, **1059.**
Analysis of Low Frequencies by Diffraction of Light at Capillary Waves.—Becker, **1454.**
Exploring-Note **Analysis** with Mechanical Band Filter and High Carrier Frequency.—Buchmann, **1913.**
Optical Curve **Analysis** [of Speech and Music].—Montgomery, **1453.**
Diffraction of Light by Sound Film of Variable-Width Type [Application to Immediate & Exact Fourier **Analysis**].—Schouten, **1452.**
The Residue, New Component in Subjective Sound **Analysis.**—Schouten, **3467.**
Analysis : see also Harmonic, Noise (To combat).
Calculation of **Articulation** for Effective Rating of Telephone Circuits.—Pocock, **1086.**
Attenuation : see Line, Tubes.
Acoustic Absorption of **Audiences,** and Acoustics of Rooms.—Gigli, **1919.**
Artificial Mastoid for **Audiphone** [Bone-Conduction Receiver] Measurements.—Hawley, **1478.**
Ortho-Technic **Audiphone,** *and* 710A Bone-Conduction Receiver.—Tuffnell : Hawley, **1479.**
Auditory Patterns [Use in Deafness Investigations].—Fletcher, **1481.**
Action of **Automatic** Devices for controlling Sound Intensity.—Galperin, **167.**
Apparatus for **Automatic Recording** of Sound Levels up to 40 000 c/s.—Ferrari-Toniolo, **667.**
Musical Scale of Highland **Bagpipe.**—Allan, **2294.**
Bass Compensation by Screen-Grid Injection ["Syncrotronic" System].—Barcus, **3898.**
Sound of **Bells :** Strike Note, *and* "Acoustic Tone" from **Bells.**—Arts, **1462** & **3911.**
Upper Frequency Limit for **Binaural Localisation** of Pure Tone by Phase Difference.—Hughes, **179.**
Piezoelectric Measurements on Absolute Auditory Threshold for **Bone Conduction.**—von Békésy, **1057.**
Bone Conduction : see also Audiphone.
"Der Ultraschall und seine Anwendung in Wissenschaft und Technik" [**Book Review**].—Bergmann, **3086.**
"Schall und Klang" [Text Book for Architects, Electrical Engineers, & Students : **Book Review**].—Bergtold, **2648.**
"Principi fondamentali di Elettroacustica teorica ed applicata" [**Book Review**].—Crescini, **1485.**
"Reduction of Noise in Buildings" [**Book Review**].—Davis & Morreau, **191.**
"Sound Transmission in Buildings : Practical Notes for Architects and Builders" [**Book Reviews**].—Fitzmaurice & Allen, **4349.**
"Acoustic Air-Jet Generator" [**Book Review**].—Hartmann, **4304.**
"Schaltschemata und Differentialgleichungen . . ." [Vibrating Systems : **Book Review**].—Hecht, **3083.**
"Grundlagen und Ergebnisse der . . ." [Supersonic-Wave Research : **Book Review**].—Hiedemann, **1933.**
"Lebendige Sprache" [with Analyses of Speech of Prominent Englishmen & Dialects : **Book Review**].—Horn & Ketterer, **1924.**
"Standards on Electroacoustics 1938" [**Book Review**].—I. R. E., **1922.**
"The Musical Ear" [**Book Review**].—Lloyd, **4328.**
"Sound : Third Edition" [**Book Review**].—Richardson, **4326.**
"Einführung in die Akustik" *and* "Leitfaden zur Berechnung von Schallvorgängen" [**Book Reviews**].—Trendelenburg : Stenzel, **1923** & **3048.**

Acoustics and Audio-Frequencies—

"Supersonics: the Science of Inaudible Sounds" [**Book Review**].—Wood, **1098.**
"Table relating Frequency to Cents" [**Book Review**].—Young, **1071.**
Book Reviews: see also Acoustical-Society.
Calculation of Acoustic Waves with Irregular **Boundaries,** *and* Solving Wave Equation in Region with Perturbed **Boundaries.**—Bolt: Feshbach & Clogston, **3457.**
Broadcast Music in Workshops, **3451.**
Modern **Broadcast Repeater** Equipments.—Meers & Filby, **1085.**
Equipment of **Broadcasting** Studios [at Hilversum].—Gradstein, **1084.**
Broadcasting: see also Amplifier, Lines, Noise, Studio.
Buildings: see Book-Review.
Approximate Calculation of Electric Field and Capacities for Some Simple Forms of Telephone **Cable.**—Meinke, **3081.**
Transmission Characteristics of 4800-Kilometre Circuit using Non-Loaded **Cable.**—Shinohara & Hirayama, **1088.**
Calibration of Microphone and Loudspeaker Response by Interrupted Sound Waves.—Hayashi, **3060.**
Calculation of **Chladni** Patterns.—Stewart & Colwell, **1045.**
Electronic **Church Chimes.**—Dostal, **182.**
Necessary Sound-Absorption Units in **Cinemas,** and Reverberation Times of the Latter.—Weisse, **3067.**
Selecting a Circuit for Limiting **Compressor.**—Galperin, **1449.**
Acoustic **Condition Factors.**—Rettinger, **1920.**
Conference: see Loudspeaking, Multiphone.
Calculation of **Cross Modulation** in Multi-Channel Transmission with Large Number of Channels.—Lubny-Gertsyk, **3079.**
Crosstalk in Coaxial Cables.—Gould: Booth & Odarenko, **4331.**
Crosstalk Reference Standard.—Nielsen, **2645.**
Diffusion of Light in **Crystal** Unequally Heated [Yielding Lower Limit of Damping Coefficient of Supersonic Waves].—Leontovitsch: Landsberg & Choubine, **1931.**
Sensitive **Current- and Voltage-Recorder** for 50 to 10 000 c/s.—Grave, **2643.**
Damping: see Pipes, Room, Tubes.
Inductive Systems for **Deaf,** in Cinemas and Theatres.—Sowter, Aldous, **1056** & **1906.**
Thyratron Inflection Indicator for Teaching the **Deaf.**—Sterne & Zimmermann, **177.**
Deaf-Aid Adaptor for Use with Standard Broadcast Set.—Wallace, **663.**
Studies of Acquired and Inherited **Deafness** in Animals.—Lurie, **2624.** For Deafness *see* also Ear.
Theory of Fluctuations in **Decay** of Sound [in a Room].—Jones, **1467** & **2634.**
Decibel in High-Frequency Technique.—Keel, **3462.**
Dark Bands in Spectra of Double **Diffraction** Gratings.—Houston, **4299.**
Diffraction of Disrupted Elastic Wave from Rectilinear Edge or Circular Orifice.—Kharkevich, **638.**
Diffraction: see also Absorbing.
Disc-Cutting Problems.—LeBel, **1450.**
Distortion Measurements by Fundamental-Suppression Methods.—Hewlett & Packard, **3928.**
Distortion: see also Ear, Light-Pattern, Microphone, Slit.
Subjective Effect of **Disturbing Signals** in Telephone Circuits.—von Susani & Schöbel, **1474.**
Receiver [Telephone or Deaf-Aid] Testing with "Artificial **Ear.**"—Ballantine, **3914.**
Ear Defenders [Investigations on Ear-Plugging Devices].—Knudsen, **659.**
Effect of Noises of Warfare on **Ear.**—Littler, **3916.**
Physiology of the **Ear** in Relation to Talking Pictures.—Rawdon-Smith, **3918.**
Measurements of Directional Properties of **Ear** carried out with Dummy.—Rosenberg & Slavinsky, **3915.**
Locus of Distortion in **Ear.**—Wever, Bray, & Lawrence, **2625.**
Ear: see also Audiphone, Auditory-Patterns, Bone-Conduction, Book-Review, Deaf, Ear-Trumpets, Hearing, Noise.
Amplifying Power of **Ear Trumpets.**—Rocard, **3913.**
New Application of **Echo-Sounding.**—Mortimer & Worthington, **1926.**
Operation and Utilisation of **Echo-Suppressors.**—Jones, **3080.**
Observations on **Edge Tones.**—Lenihan & Richardson, **3472.**
Ultrasonics and **Elasticity.**—Ludloff, **1932** & **4357.**
Electroacoustic: see Quartz, Surveys.
Notes on **End-Corrections.**—Tyte, **4322.**
Expressions for **Energy** in Acoustics.—Andreev, **4334.**
Sound-**Energy Density** in Enclosure excited by Directional Source.—Suharevsky, **3458.**
Constant Impedance **Equalisers:** Simplified Method of Design and Standardisation.—Pyrah, **176.**
Volume **Expansion** with a Triode.—McProud, **4318.**
Use of **Feedback** at Audio Frequencies.—Kotlov, **171.**
Theory of Acoustic **Feedback** in Sound-Reinforcing Systems.—Suharevsky, **3919.**
Experimental Investigation of Acoustic **Feedback** in Closed Room.—Suharevsky, **3920.**
Feedback: see also Recording.
Frequency Characteristics of **Film-Recorded** Sound.—Cricks, **3901.**
Filter Networks in which Corresponding Elements of Successive Sections are Changed by a Constant Factor.—Brillouin, **4307.**
Filters: see also Standing-Wave, Tube.
Papers on **Filtration** of Sound.—Lindsay, **190, 672,** & **1469.**
Exciting **Flames** for Fog Signalling.—Carrière, **4305.**
Measurement of Impact Sound Transmission through **Floors.**—Lindahl & Sabine, **2636.**
Fluids: see Inertia.
Rapid and Precise Measurement of **Frequency** [using Vecchiacchi "Electronic" Frequency Meter].—Barone, **1068.**
Apparatus for Accurate Measurements of Audio-**Frequencies.**—Ewell & others, **1455.**
Frequency Meter on Compensation Principle.—Kaden, **657.**
Some Particular Relationships between **Frequency** Characteristic and Transient Function.—Kharkevich, **1442.**
Indicating **Frequency-**Measuring Instruments for Note-Frequency and High-Frequency Technique.—Lübeck, **2644.**
Stroboscopic Measuring Instrument for **Frequencies** and Revolutions.—Sturm, **2300.**
Frequencies: see also Book-Review, Pitch, Standard, Tuning-Fork, and below.
Analysis of Varying Sound [Photographic Method of **Frequency Analysis**].—Imahori, **169.**
Method of Rapid **Frequency Analysis.**—Kobayashi, Hayashi, & Koseki, **671.**
Frequency Response: see Light-Pattern.
Terminology for Logarithmic **Frequency Units.**—Young, **670.**
An Ear to the **Future** [Anniversary Address].—Knudsen, **664.**
Generation: see Air-Jet, Standing-Wave.
Froth **Glass.**—Kitaigorodski, **3923.**
Transmission of Sound through Single and Double **Glass Surfaces.**—Renault, **4348.**
Electro-Magnetic **Gramophone** Pick-Ups.—Pinciroli, **648.**
Gramophone Record Scratch: Minimising Surface Noise in Reproduction.—Scroggie, **649.**
New Film **Gramophone.**—Wender, **4315.**
Gramophone: see also Compressor, Disc-Cutting, Pick-Ups, Recording, Records.
Armchair Spectator Conveyer-**Guide.**—Dunlop & White, **1445.**
Mechanical **Harmonic** Synthesiser-**Analyser.**—Brown, **1060.**
Application of Sound Film to **Harmonic Analysis.**—Pollak, **1063.**
Harmonic Analysis: see also Analyser, Spectroscope.
Papers on **Hearing** and **Hearing Loss.**—Beasley, **4320** (H.L. Measurements); de Boer & Vermeulen, **1053** (Apparatus for Very High Requirements); Coles, **3468** (H. Tests at World's Fair); Kerridge, **1054** (Progress in H. Aids); Lifshitz, **662** (Fluctuation of H. Threshold); Littler, **1905** & **3065** (Aids to H.); Marchant & Turney, **3064** (H. Aid for Research & Group Use); Montgomery, **1055** (Analysis of World's Fair Tests); Steinberg & Gardner, **1480** (Significance of "Hearing Loss"); Watson & Knudsen, **2623** (Selective Amplification in H. Aids). See also Ear.
Acoustic Wind Method applied to Plotting of Resonance Curves of **Helmholtz Resonator.**—Kucher & Teodorchik, **2299.**
Acoustical Investigations of Joseph **Henry** as viewed in 1940.—Snyder, **4356.**
High-Accuracy **Heterodyne Oscillators.**—Slonczewski, **4332.**
Home-Made Exponential **Horn:** Increasing Efficiency of Small Dynamic Speaker.—Combs, **635.**
Acoustical Impedance of Infinite Hyperbolic **Horn.**—Freehafer, **2609.**
Power Transmission Loss in Exponential **Horns** and Pipes with Wall Absorption.—Phelps, **4306.**
Horns: see also Filter, Transmission-Line.
Valve-Operated Smoothing Circuit: Balancing-Out **Hum, 646.**
New **Hysteresis** Model.—Goucher, **4314.**
Possibility of Formation of Acoustic **Images** in Analogy to Optics: Problem of Vision through Opaque Media.—Pohlman, **196.**
Precision Measurement of Acoustic **Impedance,** *and* Acoustic **Impedance** of Commercial Materials and Performance of Rectangular Rooms with One Treated Surface.—Beranek, **4342** & **4343.**
Variable Boundary **Impedance** for Room-Acoustics Investigations.—Bolt & Brown, **4341.**
Impedance: see also Equalisers, Horn, Multiple-Speaker, Pistons, Transmission-Lines.
Inertia of Régimes in Oscillating Fluids [including Change of Acoustic Velocities by Obstacles].—Carrière, **1927.**
Infrasonic: see Sea, Supersonic.
Sound **Insulation** Measurements.—Bausch, **675.**
Suggestion for Definition of Impact-Noise **Insulation** Coefficient.—Haller, **1080.**
Sound-**Insulation** Characteristics for Ideal Partitions.—Morrical, **673.**
Insulation: see also Glass, Noise, Non-Porous, Vibraframe.
Integral Equations of Continuous Dynamical Systems.—Ingram, **4310.**
Constant-Path Acoustic **Interferometer** for Gases at Variable Pressure.—Herget, **1930.**

Acoustics and Audio-Frequencies—

Fixed-Path Acoustic **Interferometer** for Study of Matter.—Hubbard & Zartman, **1082.**
Design and Test of Equipment by **Intermodulation Method.**—Hilliard, **3929.**
Intercrystalline Thermal Currents as Source of **Internal Friction.**—Randall, Rose, & Zener, **199.**
Iron-Cored Coils of High Efficiency.—Partridge, **3443.**
Note on **Just Intonation.**—Lloyd, **3073** & **4327.**
Design for **Keyboard** Instrument in Just Intonation.—Williamson, **1065.**
Laryngophone [Theoretical Considerations, leading to Design of Rochelle-Salt and Carbon Types].—de Boer, **1439.**
Telephony in Noisy Surroundings and Tests on **Laryngophones.**—Ferrari-Toniolo, Federici, **1897** & **3061.**
Artificial **Larynx** for Speaking and Choral Singing by One Person.—Firestone, **1477.**
Light-Pattern Calibration Chart [for Determination of Frequency Response and Amplitude Distortion].—Ebel, **2621.**
Light : see Analysis, Supersonic.
Alternative Treatment of Attenuation of Waves in Coil-Loaded Telephone **Line.**—Metson, **3455.**
Measuring **Lines** for Programme Transmission.—Harazim : Hudack, **1075.**
Localisation : see Binaural.
Long-Distance : see Cable, Telephone.
Loudness Level to Loudness Conversion Chart.—Geiger, **1473.**
Loudness Measurement : see Noise.
Loudspeakers.—de Boer, **1039** (Sound Diffusers) and **1041** (Efficiency) ; Bozak, **3893** (27-Inch L.) ; Golden, **2613** (Production & Testing) ; Goodman, **3053** (Infinite-Baffle L.) ; Hoekstra, **2611** (Vented Enclosure) ; Manfredi, **1038** (Properties of Cones) ; Olney, **2612** (Coaxial L.) ; Phelps, **2610** (Acoustic Line Ls.) ; R.C.A., **3894** ("Accordion-Edge" Cone) ; Reinhard, **634** (Inhomogeneity of Magnetic Field) ; Smith, **3051** (Output Stage & L.) ; Vermeulen, **1037** (Testing) ; West & McMillan, **1036** & **3050** (Design of L.) ; Wünsch, **3054** (Connection of Several Ls.).
Loudspeakers : see also Absolute, Calibration, Horn, Loudspeaking, Monitor-Speaker, Multiple, Pistons, Plate, Radiation, Rochelle-Salt.
Loudspeaking Telephone System.—Herckmans, **4303.**
New "Conference" Equipment with **Loudspeaking Telephone** without Valve Amplifier.—Hettwig & Pfeiffer, **2615.**
Improved **Loudspeaking Telephone.**—Hopkins, **2614.**
Inductor with Air-Gapped **Magnetic** Circuit.—Marinesco : Glazier, **3444.**
Experiments on copying Sound Tracks onto Narrow Steel Tapes for **Magnetic** Reproduction, **4316.**
Magnetic : see also Iron-Cored, Loudspeakers, Stereophonic.
Magnetostriction Oscillators.—Stenning, **2305.**
Measurement : see Absolute, Automatic-Recording, Distortion, Frequency, Lines, Noise, Pitch, Power, Sound-Level, Sound-Pressure, Sound-Spectrum.
Electrical **Megaphone.**—de Boer, **1052.**
Transverse Vibrations of Curved **Membranes.**—Weatherburn, **2286.**
Unitary Theory of Proper Values of **Membranes** and of Plates with Fixed Edges.—Weinstein, **2287.**
Microphones.—**3445** (Electrodynamic Moving-Coil Ms.) ; **1899** (Data of American Types) ; Baerwald, **4313** (Absolute Noise Level) ; Baumzweiger, **2617** (Random Efficiency) ; Ernsthausen, **1047** (Absolute Calibration) ; Gigli, **644** (Outline & Classification ; Conditions for Best Reproduction) ; Glover, **1438** (Cardioid-Type Ms.) ; Hathaway, **643** (Effect of M. Polarity on Percentage Modulation : see also Polarity) ; Jofe, **2283** (Design of Unidirectional M.) ; Massa, **642** (Efficiency) ; Olson, G. W. O. H., **641** (Directive "Line" Ms.) ; Priem, **2285** (Thermal Damping in Air Spaces) ; Phelps, **645** (Sound Source for investigating Distortion) ; Western Electric, **2618** (Multimike M. with Various Patterns).
Microphones : see also Absolute, Amplification, Calibration, Hum, Hysteresis, Laryngophone, Polarity, Probe, Sound-Spectrum, Standing-Waves, Vibration (Sphere).
Monitor Speaker with Wide Frequency Range.—R.C.A., **4302.**
Harmonic Theory of Noise in Induction **Motors.**—Morrill, **4355.**
Multiphone Working.—Ayers & Stevens, **3450.**
Mutual Acoustic Impedance in **Multiple-Speaker** Systems.—Knowles, **3891.**
New Electrical **Musical Instrument :** "Storytone," **180.**
Electrical **Musical Instruments** [Survey].—Ferrari-Toniolo, **183.**
New Electronic **Musical Instrument** [Organ].—Kent, **1458.**
Electronic **Musical Instruments.**—Hughes, **1909.**
Musical Instruments : see Bells, Church-Chimes, Keyboard, Organ, Piano, Pick-Up, Pipes, Pitch, Plucked, Recorders, Reed, Reproducers, Synthesis, Survey-of-Prospects, Tuning.
Suggestion for Simplified **Musical Notation.**—Edwards, **1463.**
Noise.—**1915** (To combat Noise : Analysers, etc.) ; Basu, **660** (Baneful Effects of N.) ; Brittain, **669** (Continuous-Spectrum N., and Loudness Measurements) ; Churcher & King, **2639** (Transformer N.) ; Dietze & Goodale, **668** (Composite N. from Random Variable Sources) ; Jansky, **1475** (Characteristics of Certain Types of N.) ; Kono, **1074** (N. Disturbance in Broadcast Band) ; Leedy, **1471** (N. & Vibration Isolation) ; Nuovo, **1073** (N. Source with Continuous & Uniform Spectrum) ; Peterson, **1476** (Gas-Tube N. Generator for Circuit Testing) ; Redfearn, **4351** (Source/Observer Problems) ; Sabine, **4352** (Ventilating Ducts) ; Scott, **3927** (Measurements of N. & Vibration) ; Seacord, **3459** & **4350** (Room N.) ; Van Liere, **2638** (High-Pitched Ns. have Greater Effect).
Noise : see also Aerofoils, Book-Review, Disturbing-Signals, Ear, Insulation-Coefficient, Laryngophone, Microphones, Motors, Propeller, Sound-Spectrum, Thunder-Screen.
Sound Prevention Mechanism of **Non-Porous** Materials.—Kawashima, **4347.**
Organ.—Jones, **653** (O. Pipes) ; Merrill, **3075** (Electronic Reed O.) ; Northrop, **4321** (Analysis of Tone of Open O. Pipe) ; Trautwein, **181** (Tempered Note Frequencies, & Drive of Electric Organs) ; Trimmer, **653** (Resonant Frequencies of Certain Pipe Combinations) ; Winch & Midgley, **1457** & **3074** (Electronic Musical Instruments & Pipeless O.).
Instability of Linear and Non-Linear **Oscillations** ("Mitnahme" Oscillations).—Wenke, **2626** & **3049.**
Resistance-Capacitance Audio-Frequency **Oscillator** [One-Valve Circuit].—Brettell, **3925.**
Beat-Frequency **Oscillator.**—Marconi-Ekco, **3466.**
Multi-Frequency **Oscillator** for Audio Testing.—Quinn, **3926.**
Calibration Circuit for Audio **Oscillators.**—Rehfisch & Bissmire **3924.**
1000 c/s **Oscillator** free from Grid Current and with 5 c's Frequency Adjustment by Phase Rotation in Feedback Path.—Zaiser, **2302.**
Oscillators : see also Heterodyne, Magnetostriction.
Recent Work in Experimental **Phonetics.**—Richardson, **3470.**
Barrier-Layer **Photocells** for Sub-Standard Talkies, **3905.**
Influence of Soundboard on **Piano** Tone Quality.—Bilhuber & Johnson, **1461.**
Pianoforte String and Hammer.—Ghosh, **185** & **2291.**
Theory and Practice of Excitation of **Piano** Strings, *and* Measurements of Sound Volume of Pianoforte.—Jakovlev : Belov & Ugolnikov, **184** & **2292.**
Novachord [Hammond Electronic **Piano**].—Merrill, **652.**
New **Pick-Ups :** Two Moving-Coils and a Crystal, **3063.**
Electronic Music [**Pick-Up** Devices for Pianos, Violins, etc.].—Daniel, **3909.**
New Gramophone **Pick-Up** controlling Light-Beam by Mirror.—, Grimes : Philco, **3449** & **3906.**
Piezoelectricity of KH_2PO_4, *and* Specific-Heat Anomaly of KH_2PO_4 at Upper Curie Point.—Lüdy : Bantle, **640.**
Piezoelectricity : see also Rochelle-Salt.
Effect of Wall Materials on Steady-State Acoustic Spectrum of Flue **Pipes.**—Boner & Newman, **4323.**
Transmission of Sound inside **Pipes.**—Morse, **680.**
Interaction Impedance of System of Circular **Pistons.**—Klapman, **1443.**
Genesis of Absolute **Pitch.**—Bachem, **3072.**
Recording of Small **Pitch** Fluctuations.—Grützmacher & Lottermoser, **1912.**
Musical **Pitch** of Orchestras.—Madella, **1456** & **2301.**
Further Applications of Our Direct-Reading **Pitch** and Intensity Recorder.—Obata & Kobayashi, **4324.**
Pitch of Musical Instruments and Orchestras.—van der Pol & Addink, **1070.**
International Standard of Musical **Pitch.**—Richardson, **4325.**
Pitch : see also Frequency, Speech, Standard.
Analysis of Vibration of Clamped Circular **Plate** which is subjected to Internal Resistance.—Hayasaka, **4311.**
Vibrations of Free Square **Plates.**—Waller, **174** & **3448.**
Plates : see also Membranes, Poisson's, Vibrating, Vibrometer.
Theory of Arrangement of Frets on Finger Board of **Plucked** Instruments.—Jakovlev, **1460.**
Simple Method of finding **Poisson's Ratio.**—Waller, **4312.**
Specific Heat of Substance showing Spontaneous Electric **Polarisation.**—Mendelssohn, **173.**
Lop-Sided Speech and Modulation : Voice-Wave **Polarity** and Effect on 'Phone Transmitter Operation.—Grammer, **1900.**
Sound Propagation at Grazing Incidence to **Porous** Materials.—Schuster, **674** & **2631.**
Use of Thermocouple and Fluxmeter for Measurement of Average **Power** of Irregular Waves, *and* Grassot Fluxmeter as Quantity Meter.—Dunn, **1077.**
Pressure : see Radiation, Sound-Pressure.
Acoustic **Probe.**—Fedorovich & Saltykov, **1076.**
Radio **Progress** during 1939 : Electroacoustics, **3082.**
Report on **Progress** in Sound.—Richardson, **1089.**
New Apparatus for Representation and Investigation of **Progressive Waves** along Flexible Carrier.—Bruns, **3078.**
Propagation of Plane Sound Waves in Neighbourhood of Absorptive Plane.—Brillouin, **685.**
Propagation of Sound in Homogeneous Atmosphere.—Rocard, **4300.**
Propagation : see also Absorbing, Porous, Progressive, Shock, Thermodynamics, Viscosity.

Acoustics and Audio-Frequencies—

Propeller Rotation Noise due to Torque and Thrust.—Deming, **4354.**
" Rotation Sound " of **Propellers.**—Nepomnaschij, **2312.**
High-Fidelity **Public Address** and Translating System.—Wilburn & Tenac, **3059.**
Electro-Acoustic Reactions, with Special Reference to **Quartz**-Crystal Vibrators.—Starr, **3069.**
Tone-Frequency Control- and Filter-**Quartzes.**—Rohde, **2303.**
Radiation of Sound [Differential Equations for " Pulsating-Sphere " Air Movement, and Their Solutions: etc.].—van Urk & Vermeulen, **1040.**
Sound **Radiation Pressure** in Liquids.—Hertz & Mende, **1092.**
Question of Sound **Radiation Pressure.**—Richter, **3463.**
Theory of Acoustic **Radiation Pressure.**—Schaefer, **186.**
Radiator : see Transient-Function.
Sound **Radiometer** of Resonance Type.—Hayashi, **1918.**
Application of **Rayleigh** Principle to Calculation of Acoustic Systems.—van den Dungen, **666.**
Improvements in Disc **Records** through Constant-Amplitude Recording.—Duffield, **2620.**
Embossing [of Gramophone **Records**] at Constant Groove Speed.—Griffin, **4317.**
Titanium Compounds as Fillers: Reduced Surface Noise and Increased Life of Gramophone **Records.**—R.C.A., **3907.**
Getting the Best from **Records.**—Voigt, **1050, 1904,** & **2290.**
Gramophone **Recorder** Characteristics [American Types], **1903.**
Investigations on **Recorders** [Blockflöten].—von Lüpke, **1908.**
Photoelectric Tape **Recording** [Mechanical Engraving for Photoelectric Reproduction], **3903.**
Simple Apparatus for Sound **Recording.**—de Boer & van Urk, **1051.**
Wrinkles in **Recording.**—Jacques, **172.**
Construction and Operation of Steel-Wire **Recording** Apparatus.—Mansi, **2289** & **3904.**
Motor Van for Sound **Recording** by Philips-Miller System, **1451.**
Feedback improves Electromechanical **Recording.**—Vieth, **1902.**
Recording : see Automatic, Current-&-Voltage, Pitch, Sound-Film, Stereophonic.
New Method of Logarithmic **Rectification.**—Hayasi & Akasi, **3899.**
Stability of Sound emitted by Tube with Beating **Reed** under Constant Pressure.—Auger, **175.**
Auto-Vibrations of Harmonica **Reeds,** and Production of Sound.—Konstantinov, **3473.**
Method for Determination of **Reflecting** Power of Ground Surfaces [in connection with Aircraft Acoustic Altimeters].—Ernsthausen & von Wittern, **1095.**
Papers on " Picture of **Reflection.**"—Chigrinski, **1081, 2627,** & **3066.**
Reflection : see also Rooms.
Reflection-Coefficients : see Interferometer.
Relaxation Methods applied to Engineering Problems.—Gandy, Pellew, Southwell, **3084.**
Voice-Operated **Relay** for Long-Distance Private Wires.—Fairweather, **3452.**
New Electrical **Reproducers** applicable in Field of Electroacoustics and for Broadcasting of Music without Microphone.—Giulietti, **3076.**
Variable Acoustic **Resistance** Standard [for Measurements of Absorption, etc.].—Schuster & Stöhr, **2642.**
Sound Absorption of **Resonators.**—Jordan, **2298.**
Resonators : see also Helmholtz, Vowels.
Simple Apparatus for Measurement of **Reverberation** Time.—Calza & Nuovo, **1465.**
Reverberation and Acoustics in Case of Prismatic Polyhedrons.—Chigrinski, **3066.**
Reverberation Time and Attenuation Coefficient at Grazing Incidence.—Cremer, **2297.**
Synthetic **Reverberation.**—Goldmark & Hendrick, **1464.**
Effective Values of **Reverberation.**—Kostzov, **1466.**
Derivation of **Reverberation** Formula.—Schuster, **676.**
Measurement of **Reverberation** Time, using Several Microphones.—Vecchiacchi & Nuovo, **1083.**
Reverberation : see also Cinemas, Reflection (Picture of).
Crystal Structure of **Rochelle Salt.**—Beevers & Hughes, **3446.**
" Heavy " **Rochelle Salt :** Dielectric Investigations.—Hablützel, **2316.**
Heavy-Water **Rochelle-Salt** Crystals.—Holden, **173, 1440,** & **4301.**
Properties of **Rochelle Salt,** *and* Influence of Electrostatic Fields on the Elastic Properties of **Rochelle Salt.**—Mueller, **3052.**
Nature of Anomalies of Some Properties of **Rochelle Salt** and Its Relation to Polymorphism.—Schulwas-Sorokina, **1042.**
Contour Vibrations of Rectangular **Rochelle-Salt** Plate, *and* Thickness Vibrations of **Rochelle-Salt** Plate.—Takagi, Miyake, Sakamoto, **3447.**
Rochelle Salt : see also Piezoelectricity, Polarisation.
Normal Modes of Vibration in **Room** Acoustics: Experimental Investigations in Non-Rectangular Enclosures.—Bolt, **678.**
Damping of Sound in **Room** with Solid Walls, and Diffusion Coefficient of Sound Absorption.—Konstantinov, **677.**
Non-Uniform Acoustical Boundaries in Rectangular **Rooms**—Maa, **4344.**
Arrangement for Regulating Acoustic Properties of **Rooms.**—Oelsner, **189.**
Normal Modes of Vibration of **Rooms** with Non-Planar Walls, and Investigation of Diffuse Sound Reflection.—Skudrzyk, **1468.**
Rooms : see also Audiences, Condition-Factors, Decay, Energy-Density, Feedback, Impedance, Reverberation, Studio.
" Voice of the **Sea** " [Shoulejkin's Infrasonic Vibrations].—Andreev, **1093.**
Secrecy by Inversion of Syllables.—Marro, **2296.**
Papers on **Shock** Waves and Theory of Propagated Discontinuity.—Thompson, Riffolt, **1090** & **3328.**
Shock Waves in Air and Characteristics of Instruments for Their Measurement.—Thompson, **4330.**
Correction of Distortion due to Optical **Slit.**—Kharkevich, **1444.**
Smoothing : see Hum.
Development of **Sound Equipment** [Public Address, etc: Electrical Production of Air-Raid Signal].—Bennett, **1448.**
Sound Fields : see Probe.
Transport of **Sound Film** in Apparatus for Recording and Reproduction.—Hardenberg, **2288.**
Sound on **Film :** Photographic Methods of Recording.—Miller, **3902.**
Volume Range of **Sound-on-Film** Recording.—Cricks, **3900.**
Sound Films : see also Ear, Film-Recorded, Guide, Photocell, Slit, Syncrosound.
Sound-Measurement Objectives and **Sound-Level** Meter Performance.—Barstow, **4336.**
Sound-Level Meters from User's Viewpoint.—Huber & Whitmore, **4337.**
Sound Levels : see Automatic-Recording, Decibel.
Sound Pressure on Spheres.—Fox: King, **4333.**
Electroacoustic **Sound-Pressure** Measurements in Practice.—Gosewinkel & Spandöck, **2628.**
Equivalent Circuit of Spherical **Sound-Source.**—Cremer: Weber, **1916.**
Sound Spectrum of Explosive Sparks and Flobert Pistols: Application in Electroacoustic Measuring Technique.—Weber, **1072** & **4338.**
Sparks : see Sound-Spectrum.
Speaking-Aid for Dumb by Injury of Vocal Cords.—Wright, **3912.**
Resonance Method for Measuring the Ratio of **Specific Heats** of Gas.—Clark & Katz, **2311.**
Acoustic **Spectroscope** [for Demonstration].—Schouten, **1062.**
Starting Characteristics of **Speech** Sounds.—Drew & Kellogg, **4319.**
Statistical Measurements on Conversational **Speech.**—Dunn & White, **1482.**
Recent Experimental Investigations of Vocal Pitch in **Speech.**—Fairbanks, **2646.**
Reversed **Speech.**—Kellogg, **3917.**
Speech : see Analysis, Book-Review, Larynx, Vocal-Chords, Vocoder.
Spherical : see Sound-Source, Vibration.
Square Waves [and Response of Networks].—Arguimbau, **3071.**
Portable Apparatus for Measurement of **Standard** Pitch Note.—Barone, **1069.**
High-Precision Checking of **Standard** Pitch Note.—Madella, **656.**
Continuous Broadcast of **Standard** of Musical Pitch Inaugurated.—Nat. Bureau of Standards, **656** *bis.*
Standard : see also Book-Review, Pitch.
Multi-Stage **Standing-Wave** Circuits [with Application to Acoustics].—Okabe, **3890.**
Generation of Extremely Strong **Standing Waves** in Air.—Oberst, **1898.**
Stereophonic Recordings of Enhanced Music [Carnegie Hall Demonstrations], **2058, 3056, 3057,** & **3892.**
Stethoscope with Variable Sensitivity and Selectivity.—Frossard, **658.**
Stethoscope : see also Analyser.
Scientific Search for Secret of **Stradivarius.**—Saunders, **1459.**
Stroboscope : see also Frequencies, Supersonic, and under " Miscellaneous."
Satellite-**Studio** Equipment.—Feikert, **3922.**
Use of " Acoustivanes " in C.B.S. New **Studios,** 3921.
Acoustic Treatment and Measurements of New Bombay **Studios** of All-India Radio.—Sahdev, **188.**
Studios : see also Broadcasting.
Subharmonics : see Oscillations.
Supersonic Waves.—Adam, **1094** (Infrasonic & Ultrasonic Waves); Bär, **2310** (Determination of Elastic Constants by S.W.); Bazulin, **1928** (Absorption by Electrolytes); David, **2649** (Optical Method of Absorption Measurement); Field, **193** & **3476** (Dispersion & Absorption); Fox & Rock, **689** (S. Stroboscope for Wavelengths in Liquids); Giacomini & Bertini, **688** (Homogeneity of Solids); Gregg, **3475** (Optical Measurement of Absorption) and **3933** (Absorption in Liquids); Hartmann & Focke, **197** & **2308** (Absorption); Jatkar, **3934** (Velocity); Leonard, **3935** (Absorption in Carbon Dioxide); Liepmann, **683** (Velocity in Liquid Argon); Lucas, **1489** (Double Refraction in Liquids); Mikhailov, **3932** (Velocity & Absorption in Liquid Mixtures); Nath, **682** (Theories of Light Diffraction); Neu-

mann, **195** (Influence of Angle of Incidence on Diffraction); Peterson, **2649** (Optical Measurement of S. Absorption); Ponzio, **1488** (Physiological Effects); Pumper, **1928** (Absorption in Air & Monatomic Gases); Railston, **1096** (Dispersion in Vapours); Riabouchinsky, **201** & **686** (S. Analogy with Electromagnetic Field); Richardson, **3474** (Propagation in Liquids); Rieckmann, **203** (Absorption in Mercury); Salisbury & Porter, **194** (Efficient Piezoelectric Oscillator); Sanders, **192** (Transmission through Thin Plates); Schmid & Roll, **2307** (Effect of Intense Sound on Molten Metals); Shear & Focke, **197, 2309,** & **3476** (Dispersion in Rods of Polycrystalline Metals); Willard, **3475** (Velocity & Absorption in Liquids); Zachoval, **684** (Dispersion); Zartman & Smith, **3933** (Absorption).

Supersonic Waves : see also Amorphous, Analysis, Book-Review, Crystal, Diffraction, Echo-Sounding, Elasticity, Magnetostriction, Velocity.

Sound [**Survey**].—Richardson, **1921.**

1940 Sound [**Survey of Prospects**].—Taylor, **1910** & **2619.**

Surveys : see also Acoustics, Future, Progress.

Syncrosound System [for 8 & 16 mm Pictures].—Powell, **1446.**

Synthephone [for **Synthesis** of Musical & Other Sounds].—Culver & Williams, **654.**

Synthetic Sound [for Problems in Physiological Acoustics].—Schouten, **1061.**

Synthetic : see also Harmonic-Analyser, Reverberation, Vocoder.

Method of Equalising Attenuation in Long-Distance **Telephone** Circuits.—Iida & Akiyama, **1087.**

Improved Commercial **Telephone** Receiver.—Roberton, **1441.**

Sound Tests of **Telephone** Ringers and Dials.—Stryker, **3930.**

Determining Efficiency of Resonance **Telephones.**—Mrass, **3062.**

Telephones : see also Articulation, Magnetic, Noise.

Terminology : see Frequency.

Tests : see Ear, Intermodulation, Oscillator, Telephone.

Sound in the **Theatre.**—Burris-Meyer, **1447.**

Sound-Control Apparatus for **Theatre.**—Burris-Meyer, **4329.**

Propagation of Elastic Waves: **Thermodynamic** Application.—Parodi, **1486.**

Small Electrical **" Thunder Screen "** produces Varieties of Crashes. Burris-Meyer, **3077.**

Automatic **Time and Weather** Systems.—Winner, **650.**

Tone : see Organ, Pipes.

Better Utilisation of **Transformers** with Tapping Points.—Wünsch, **1049.**

Effects of Hum-Bucking Construction and Magnetic Shielding in A.F. **Transformers.**—Fortune, **3055.**

Relationship between Shape of Sound Radiator and **Transient Function.**—Kharkevich, **637.**

Transient Function : see also Frequency.

Acoustic **Transmission Line** for Impedance Measurement [on Horns, Filters, etc.].—Hall, **636.**

Acoustical **Tube** as High-Pass Filter.—Brillouin, **4308.**

Transmission of Sound in Water-Filled **Tubes.**—Ganitta, **2313.**

Attenuation of Sound in **Tubes.**—Rogers: Fay, **2633** & **4309.**

Sound Damping in Rigid- and Elastic-Wall **Tubes.**—Waetzmann & Wenke, **681.**

Tubes : see also Pipes.

Resonoscope [for Accurate **Tuning** of Musical Instruments].—Wolf & Holmes, **3908.**

Tuning Fork maintained by Photocell.—Cambridge Instrument, **1911.**

Miniature Electrically Maintained **Tuning Fork.**—Muirhead, **3070**

Tuning-Fork Stabilisation.—Norrman, **2641.**

Ultrasonic : see Supersonic.

Change of **Velocity** of Sound with Temperature.—Bate, **200** & **1925.**

Study of **Velocity** and Absorption of Sound in Liquids under Pressure.—Biquard, **1487.**

Determination of **Velocity** of Sound in Gas: Application to Analysis of Mixtures of Helium, Oxygen, and Nitrogen.—Dublin, **202.**

Sound **Velocity** and Inter-Molecular Forces.—Rao, **1097.**

Papers on Connections between **Velocity** of Sound and Constitution of Organic Compounds.—Schaaffs, **204, 687,** & **1929.**

Velocity : see also Inertia.

Experimental Investigation of Sound Damping in **Ventilation Shafts.**—Belov & Fainstein, **2632.**

Vibratory Characteristics of **Vibraſram** [formerly Heerwagen Tiles].—Ham & Darracott, **1470.**

Perception of **Vibrations.**—von Békésy, **661, 1058,** & **2637.**

Torsional **Vibrations** of Crystalline Cylinder.—Brown, **2304.**

Electrodynamic Detector of Mechanical **Vibrations,** and Applications.—Giulietti, **2293.**

Vibration of Free Circular Plate [with Application to Tourmalin Piezo-Oscillators].—Hayasaka, **1043.**

Forced Radial **Vibration** of Hollow Sphere.—Matudaira & H., **2284.**

Asymptotic Properties of Fundamental Functions in **Vibrations** in Elastic Body.—Pleijel, **198** & **639.**

Effect of Rotatory and Lateral Inertia on Flexural **Vibration** of Prismatic Bars.—Thomson, **1046.**

Properties of Linear Systems used in **Vibration-**Measuring Instruments.—Trimmer, **4340.**

Experimental Investigation of Quasi-Harmonic **Vibrator.**—Neusinger, **1917.**

Vibrations, Vibrators : see Chladni, Integral-Equation, Internal-Friction, Noise, Plates, Quartz, Reeds, Rooms, Vibrometer, and under "Miscellaneous."

Effect of Back Chamber to Clamped Circular Plate [of **Vibrometer**].—Hayasaka, **1044.**

Variations in Quality of **Violin** after Repair by Expert, **1067.**

New Results in Research on **Violins.**—Backhaus & Weymann, **651** & **3910.**

Acoustical Properties of Especially Fine-Toned **Violins.**—Meinel, **1066.**

Perspectives in Development of **Violin.**—Vermeulen, **1907.**

Violin : see also Pick-Up, Reproducers, Stradivarius.

Propagation of Waves in Liquid possessing " Maxwell **Viscosity.**"—Issakovich, **1091.**

Visible Sound Waves [Dark Bars running along Exhaust Trails during Air Fighting].—Blackie, **4298.**

High-Speed Motion Pictures of the Human **Vocal Chords.**—Farnsworth, **2295.**

Remaking Speech [Description of **Vocoder**].—Dudley, **655** & **1064.**

New Approaches to Science of **Voice.**—Seashore, **178.**

Paradox of **Voice** Teaching.—Bartholomew, **3469.**

New Standard **Volume Indicator** and Reference Level.—Chinn, Gannett, & Morris, **187** & **1472.**

" Vu " and New **Volume Indicator.**—Brand, **3464.**

Constants of Resonators involved in Production of Sustained **Vowels** " Oh " and " Ah."—Lewis & Tuthill, **3471.**

Performance of Electrostatic **Wattmeters.**—Francini: Perucca, **3465.**

PHOTOTELEGRAPHY AND TELEVISION

Simple Television **Aerials.**—Carter, **705.**

Compensation of **Aerial Reactances** of Television Transmitters.—Labus, **231.**

Correction of **After-Glow** in Cathode-Ray Scanning.—Müller, **1105.**

After-Glow of Phosphors and Rôle in Light-Ray Scanner with Cathode-Ray Tube.—Brückersteinkuhl, **1511.**

Television Reception in **Airplane.**—Holmes, **1490.**

Production **Alignment** Apparatus for Television Receivers.—Hartley, **236.**

Electron-Diffraction Study of Surfaces of **Alkali** and Alkaline-Earth Metals exposed to Air.—Yamaguchi, **3108.**

Adsorption of Non-Polar Gases on **Alkali Halide** Crystals.—Orr, **1108.**

Examination of Coloured **Alkali Halides** for Photoelectric Hall Effect.—Evans, **1517.**

Alkali-Halides : see also Crystals, Potassium, Scophony, and under " Subsidiary Apparatus & Materials."

New Electronic Television Transmitting System for **Amateur.**—Sherman, **3090.**

Efficient Ultra-High-Frequency Unit for **Amateur** Television Transmitter.—Waller, **3490.**

Limiting Sensitivity of Alternating-Current Method of Photocell-Current **Amplification.**—Johnson, Mock, & Hopkins, **1113.**

[Ultra-] Short-Wave Wide-Band **Amplification.**—Strutt & van der Ziel, **1120.**

Amplifier Characteristics at Low Frequencies, with Particular Reference to New Method of Frequency Compensation of Single Stages.—Edwards & Cherry, **4365.**

Application of Feedback to Wide-Band Output **Amplifiers.**—Everest & Johnston, **1940.**

Shunt Peaking Compensation [Graphical Method for Wide-Band **Amplifiers**].—Freeman, **2853.**

Reflex Television **Amplifier :** New Amplifier using Balanced Bridge Circuits.—General Electric, **3953.**

Wide-Band **Amplifier :** High-Frequency Correction by Auxiliary Valves.—Pieplow, **2652.**

Amplifiers : see also Intermediate-Frequency, Photovoltaic, Secondary, Signal-Frequency, Superheterodyne, Tensor, Transient, Vector-Response.

Television Receiving **Antennas** and Transmission Lines.—Barber, **1947.**

Antennas and Transmission Lines at Empire State Television Station.—Lindenblad, **3941.**

Antimony : see Photocathodes, Swiss.

Papers on " Photo-**Augetron,**" **2339.**

Design Considerations of **Augetron** Secondary-Emission Amplifier, **4368.**

Two-Way Facsimile Unit developed for **Aviation.**—Finch, **721.**

Automatic **Background** Control of Television Pictures.—General Electric, **3946.**

Barium : see Sodium.

Photoelectric Cells sensitive to Long-Wave Radiation: **Bismuth-Sulphide** Cell.—Fink & Mackey, **3967.**

" Television Receiving Equipment " [**Book Review**].—Cocking, **3503.**

" Photoelectric and Selenium Cells " [including Industrial Applications: **Book Review**].—Fielding, **3968.**

" Principles of Television Engineering " [**Book Review**].—Fink, **3489.**

" Die Photozelle in der Technik " [**Book Review**].—Geffcken & Richter, **3109.**

Phototelegraphy and Television—

"Photowiderstände" [Selenium & Other Photocells: **Book Review**].—Thirring & Fuchs, **1523.**
"Television—the Electronics of Image Transmission" [**Book Reviews**].—Zworykin & Morton, **3948.**
Portable Television **Broadcasting.**—Lubcke, **3939.**
Influence of Impedance Irregularities on Transmission Properties of Wide-Band **Cables.**—Grün, **1499.**
Television Transmission over Telephone **Cables.**—Weis, **1501.**
Cables : see also Coaxial, Concentric, Telephone-Lines.
Practical Construction of **Cathode-Ray** Storage-Type Projecting Tubes.—von Ardenne, **1099.**
Ring Focusing of Negative Ions in **Cathode-Ray** Beam.—Bachman, Woodcock, **1515** & **4361.**
Raster Shapes with Double Magnetic Deflection in Wide-Angle **Cathode-Ray** Tubes.—Günther, **219.**
Implosion of **Cathode-Ray** Tubes.—Smyth, **1101** & **3491.**
Cathode-Ray : see also After-Glow, Distortion, Electron-Optics, Fluorescent, Focus, Lens, Luminescent, Screens, Sweep, and under "Subsidiary Apparatus & Materials."
Measurement of Coefficient of Attenuation of **Coaxial** Cables at Ultra-High Frequencies.—Malatesta, **693.**
"S.I.C.E." **Coaxial** Cable for High Frequencies.—Soc. Italiana C.E., **2322.**
Colloids : see Electro-Optical, Fundamentals.
Television in Natural **Colour.**—Lorenzen, **3944.**
Colour-Television : see also Interlaced-Scanning (Multiple).
Television **Committee** Organises, **4359.**
Emission from **Composite Cathodes** under Simultaneous Electron Bombardment and Illumination.—Borzyak, **2338.**
Mechanism of Secondary Emission of Electrons from **Composite Surfaces.**—Timofeev, **3495.**
Ultra-Short Waves in **Concentric** Cables and Hollow Resonators with Perforated-Disc Ends, *and* **Concentric** Cables with Longitudinally Stratified Dielectric as Band-Stop Filters in *m* Wave Range and Below.—Buchholz, **1498.**
Coronaviser, for Observing Solar Corona by Television Technique.—Skellett, **241** & **1937.**
Simple **Coupling Transformer** Unit for Television Receivers.—R.C.A., **4364.**
Photoconductivity of Tartaric Acid **Crystals** [Effect of External E.M.F.].—Brady & Todd, **717.**
Volume Rectifying Action in Cu_2O **Crystals.**—Lambert, **1522.**
Binding of Stochiometrically Surplus Sodium in NaCl **Crystals** with Added $SrCl_2$.—Pick, **212.**
Crystals : see also Scophony, Secondary.
Electronic Theory of Crystalline Compounds of **Cuprous-Oxide** Type.—Dressnandt, **4371.**
Photosensitivity of **Cuprous-Oxide** Electrodes.—Miseliuk, **3969.**
Cuprous Oxide : see also Crystals, Semiconductor.
Transmission and Reception of **D.C. Component** in Television.—Novakovski, **225.**
Deflection and Video Chassis for Television Reception.—Lawrence, **1941.**
Deflection : see also Fundamentals, Receivers, Time-Base.
Detail : see Lines, Selective-Sideband.
Detector : see Receivers.
Deuterium : see Sensitisation.
Influence of Angle of Incidence on **Diffraction** of Light by Supersonic Waves.—Neumann, **215.**
Theories of **Diffraction** of Light by Supersonic Waves.—Nath, **719.**
Trapezium **Distortion** in Cathode-Ray Tubes.—Fleming-Williams, **1934.**
Methods and Apparatus for measuring Phase **Distortion.**—Lévy, **257** & **2323.**
Distortion : see also Slit.
Papers on the **DuMont** Proposals [for Changes in R.M.A. Standards], **2314, 2654,** & **3480.**
Electron : see Photoelectrons, and below.
Function of **Electron Bombardment** [in Pick-Up Tubes & Receiving Tubes].—Maloff, **208.**
Design and Performance of **Electron Diffraction Camera.**—Ruedy: R.C.A., **3496.**
Production of Low-Voltage Secondary-**Electron Multipliers** with Copper/Sulphur/Caesium Layers.—Badikova: Kubetski, **3494.**
Electron-Multiplier Phototube.—Farnsworth, **3965.**
Carrier Introduction with Secondary-**Electron Multipliers.**—Geest, **1503.**
Experiences with **Electron-Multiplier** Photocells of Different Types, as regards Dark Current and Stability.—Harrison & Bentley, **3966.**
Mode of Action of **Electron Multiplier.**—Orthuber & Recknagel, **2341.**
Electrostatic **Electron Multiplier,** *and* Residual Current in Electrostatic **Electron Multipliers.**—Zworykin & Rajchman, **209.**
Electron-Multiplier : see also Augetron, Multiplier, Photocells.
New **Electro-Optical** Effect [shown by Bentonite Colloids].—Mueller & Sakmann, **218.**
Application of Electric and Magnetic Fields in **Electron-Optics.**—Brüche, **2665.**
Electron Optics of Cylindrical Electric and Magnetic Fields.—Rose, **1516.**
Electron Optics : see also under "Subsidiary Apparatus."
Cathode-Ray View-Finder for **Emitron.**—E.M.I., **2333.**
Emitron : see also Pick-Ups (France).
Energy : see Photoelectrons.
Wireless **Exhibition,** 1939; Technical Survey, **239.**
Exhibitions : see also German, Swiss, and under "Miscellaneous."
Demonstrating Broadcast **Facsimile** at New York World's Fair.—Baracket, **3936.**
Facsimile Transmission [Recent American Developments].—Herrick, **1954.**
Radio **Facsimile** by Sub-Carrier Frequency Modulation.—Mathes & Whitaker, **720.**
Facsimile Telegraphy: New Commercial Applications.—Hackenberg, **2324.**
Facsimile : see also Aviation, Phototelegraphy, Pictures.
Faraday Effect : see Kerr.
Feedback : see Amplifier, and under "Properties of Circuits."
Television Control Equipment for **Film** Transmission.—Campbell, **3478.**
Explanation of Anomalies of Optical Constants of Thin Metallic **Films.**—David, **1108.**
Protection of Thin Metal **Films** against Oxidation.—Ehrenberg, **1507.**
Optics of Very Thin Metallic **Films.**—Hacman, **711.**
Optical Properties of Semitransparent Sputtered **Films** determined by Interference of Light.—Nathanson & Bartberger, **1951.**
Reflection and Transmission Factors of Thin Metal **Films.**—Rouard, **1107.**
Lenticulated **Film** makes Pictures with Depth in Ordinary Amateur's Camera.—Winnek, **3479.**
Films : see also Foils, Infra-Red, Silver, Sound-Films.
Filters : see Separating, Vestigial.
Fluorescent : see also After-Glow, Films, Luminescent, Phosphors, Screen, Willemite, and under "Subsidiary Apparatus."
Maintaining Spot **Focus** in Cathode-Ray Tubes.—E.M.I., **2329.**
Influence of Space Charge on **Focusing** of Cathode Rays.—Reusse & Ripper, **3492.**
Fog-Landing : see Infra-Red.
Preparation of Metallic **Foils.**—Fenner, **713.**
Development and Present Tendencies of Television in **France.**—Mallein, **698.**
French Television should enter Practical Domain.—Mallein, **1122.**
Reduction of **Frequency Band** in Television Transmission.—Urie, **3943.**
Photo Transmission by **Frequency Modulation, 3937.**
Frequency Modulation in Television.—Carnahan: Loughren, **2650.**
Frequency Modulation : see also Facsimile, Relay.
Fundamentals of Television Engineering.—Everest, **695, 2657,** & **3945.**
Visit to **General Electric** Plant at Schenectady, **2661.**
Precision Television Synchronising-Signal **Generator.**—Bedford & Smith, **3961.**
Television Pulse **Generator.**—British Thomson-Houston, **3960.**
Flexible Synchronising-Pulse **Generator.**—DuMont, **4366.**
Picture Signal **Generator.**—Wilder & Brustman, **2667, 3982,** & **4362.**
16th **German** Broadcasting and Television Exhibition.—Fuchs, **240** & **2318.**
Progress and Actual Development of Television in **Germany.**—Gehrts, **699** & **2317.**
Television Service of **German** State Post Office.—Gehrts, **2656.**
Foundation of **German** Post Office Television Limited Liability Company.—Tritz, **238.**
Gradation of Television Pictures.—Kallmann, **3099.**
Image **Iconoscope.**—Iams, Morton, & Zworykin, **207.**
Recent Improvements in Design and Characteristics of **Iconoscope.**—Janes & Hickok, **206.**
New **Iconoscope** for Amateur Television Cameras.—Lamb: R.C.A., **3089.**
Iconoscope : see also Pick-Ups.
Impulse Generation [Particular Reference to German Television Standards].—Schunack, **3098.**
Fog-Landing Equipment, Ball System, using **Infra-Red** Light and Television Scanning Technique, **2678.**
Optical Constants of Thick Metal Films in Visible and Near **Infra-Red.**—Kretzmann, **3102.**
Infra-Red : see also Bismuth, and under "Miscellaneous."
Interference between Television Signals from Philco and C.B.S. Stations, separated by 90 Miles, **3940.**
Papers on Ignition **Interference** on Ultra-Short Waves.—Scholz & Faust, & others, **3088.**
Motor-Car **Interference** and Murphy Noise Limiting Circuit, **1942.**
Interference : see also Noise, Receiving, and under "Reception."
Interlaced Scanning and Frequency Band necessary for Television.—Lurje, **1935.**
Historical Development of **Interlaced** Scanning Method.—Raeck, **221.**
Multiple **Interlaced Scanning.**—Reichel, **1513.**
Interlaced Scanning : see also Synchronising.
Simplified Television **Intermediate-Frequency** Systems.—Mountjoy, **1492.**

Phototelegraphy and Television—

Ions (Negative) : see Cathode-Ray.
Television in **Italy** : Safar Television Equipment.—Castellani, **1497, 2316,** & **2663.**
Products of F.I.M.M. [**Italy**] in Field of Television.—Magneti Marelli, **1496.**
Projection **Kaleidoscope.**—Eddy, **1936.**
Inertia of **Kerr Effect** and Faraday Effect.—Hanle & Maercks, **1117** & **1118.**
Theory of Electric Polarisation, Electro-Optical **Kerr Effect,** and Electric Saturation in Liquids and Solutions.—Piekara, **217.**
Electrical Birefringence [Survey of Knowledge on **Kerr Effect**].—de Stefano, **2327.**
Kerr Effect : see also Electro-Optical, Polarisation.
Kinescope : see Receiver, Screens.
Transformer "**Kipp**" Devices [as in Lorenz "Small Receiver"].—Mulert & Bähring, **220.**
Astigmatism of Magnetic **Lenses,** *and* Image Error Investigations on Magnetic **Lens** free from Image Rotation.—Becker & Wallraff, **2666.**
Light : see Diffraction, Optical, Refraction.
Type of **Light Valve** for Television Reproduction [Suspension of Particles in Liquid].—Donal & Langmuir, **3500.**
Light Valve : see also Kerr-Effect, Magnetite, Optical-Shutter.
Television **Lighting.**—Eddy, **2660** & **3485.**
Determination of Optimum Number of **Lines** in Television System.—Kell, Bedford, & Fredendall, **3942.**
Lines : see Antennas.
Band Spectra of Cathodo-**Luminescence.**—Henderson, **1103.**
Charging and Decrease of Charging of **Luminescent** Materials and Semiconductors irradiated by Electrons.—Krautz, **1104.**
New Type of **Luminescent** Screen for Cathode-Ray Tubes for Television Purposes.—de Quervain, **1508.**
Luminescent : see also Fluorescent.
Theory of **Magnetite** Light Shutter.—Heaps, Elmore, McKeehan, **1949, 2326, 3101,** & **3499.**
Manganese : see Zinc-Silicate.
Photoelectric Modifications of **Mercuric Oxide** at Contact with Electrode.—Déchêne, **2347.**
Electron **Micro-Oscillograph.**—von Ardenne, **1938.**
Mixing and Limiting Circuits for Picture Signals and Blacking-Out Pulses.—R. C. A., **3957.**
Programming the Television **Mobile Unit.**—Hutchinson, **700.**
Modulation : see Sideband.
Photocell **Multiplier** Tubes.—Larson & Salinger, **3964.**
Nipkow Disc [Details of Modern Disc].—Rinia & Leblans, **1121.**
Effect of **Noise** and Interfering Signals on Television Transmission.—Jarvis & Seaman, **234.**
Noise : see also Interference.
Television **Optics.**—Wright, **1102.**
Improvement of Brilliancy of **Optical Apparatus** [by Thin Layers].—Smakula, **2325.**
Application of New Photoelectric Method to Determination of **Optical Constants** of Pure Metals, *and* **Optical Constants** of Copper/Nickel Alloys.—Bor, Hobson, & Wood, **1521.**
Optical Shutter formed by Heated Rouge in Suspension, oriented by Magnetic Field.—Heaps, **1949.** See also Magnetite.
Orthicon : see Pick-Up.
Effect of High-Frequency **Oscillation** on Photoelectric Current.—Terada, **3498.**
Oscillator : see Scanning, Time-Base.
Oscillograph : see Micro-, and under "Subsidiary Apparatus & Materials."
Charging Potentials, Secondary Emission, and Fatigue Phenomena of Metals irradiated by Electrons, and of **Phosphors.**—Hagen, **1509.**
Charging-Up and Fatigue Phenomena of **Phosphors** under Stationary Electron Beam.—Hagen, **1510.**
Phosphors : see also Fluorescent.
Relationship between Conductivity and Emission Characteristics of Caesium-Oxide **Photocathodes.**—Borzyak, **2675.**
Papers on Antimony-Caesium **Photocathodes.**—Lukyanov & others, **2346** & **2673.**
Effect of Sulphur and Oxygen on Sensitivity of BiCs–Cs **Photocathodes.**—Morozov, **2674.**
Antimony-Caesium **Photocathode.**—Prilezhaev, **2672.**
Photoelectric Effect from Photoelectrically Sensitised **Photocathodes.**—Ryzhanov, **3104.**
Photocells with Antimony-Caesium **Photocathodes.**—Zaitsev, **1112.**
Sensitisation of Antimony-Caesium **Photocathodes** by Sulphur and Selenium.—Zhukov, **714.**
Photocathodes : see also Composite-Cathodes, Photo-Surface, Potassium, Silver.
Photocells.—Belgovski, **715** (Gas-Filled, Reduced Inertia); Franzini, **1111** (with Three Electrodes); Goncharski, **2670** (Gas-Filled, Magnetic Deflection); Kruithof, **1114** (Time Lag in Gas-Filled Ps.); Penin, **2671** (Effect of Metastable Atoms on Inertia); Rodionov, Kubetski, **2340** (Applications of Multi-Stage Ps., Low-Intensity Light); Seki & others, **1110** (Increased Sensitivity by Superposed U.H.F. Voltage); Timofeev, **4369** (Multi-Stage Ps. operating on A.C.); Tungsram, **3971** (Selenium Ps. for Sub-Standard Talkies).
Photocells, Photoelectric Cells : see also Amplification, Augetron, Bismuth, Book-Review, Crystals, Cuprous-Oxide, Electron-Multiplier, Infra-Red, Mercuric-Oxide, Oscillation (H.F.), Photocathodes, Photo-Surface, Phototube, Selenium, Semiconductor, Sensitisation, Thallous, and below. Also (particularly Applications) under "Miscellaneous."
Photoeffect and Its Use in Photocells [Survey].—Verleger, **2348.**
Radius of Electron and Calculation of **Photoelectric Constant** of Metals.—Jonescu, **1520.**
Researches on **Photoelectric Effect** in Metals at High Temperatures.—della Corte, Ricca, **1519.**
Hallwachs **Photoelectric Effect** in Metals at High Temperatures.—Deaglio, **1952.**
Metallic Reflection and Surface **Photoelectric Effect.**—Makinson, **2343.**
Energy Distribution of **Photoelectrons.**—Kusknir, Vainrib, & Goncharov, **3103.**
Electrical **Photo-Engraving.**—Thorne Baker, **4372.**
New High-Sensitivity **Photo-Surface.**—Glover & Janes, **4370.**
Phototelegraphy : see Facsimile, Frequency-Modulation, Pictures, Single-Sideband.
R.C.A. **Phototube** Reference Chart, **3972.**
Einthoven String-Galvanometer/Amplifier System for Investigation of **Photovoltaic** Effects.—Vanselow, **3505.**
Photovoltaic : see also Silver.
RCA Portable Television **Pick-Up** Equipment.—Beers, **3949.**
New and Original Television **Pick-Up** Tube [based on Properties of Electrostatic Field around Thin Wire].—Braude, **3950.**
Thoughts on Television **Pick-Up** Technique.—Goebel, **3483.**
Image-Scanning **Pick-Up** Tubes.—Hartmann, **2334.**
Image Dissector [Farnsworth **Pick-Up** Tube].—Larson & Gardner, **706.**
New **Pick-Up** Tube [using "Secondary-Electron Controlling Method"].—Osawa, **2336.**
Orthicon **Pick-Up** Tubes using Low-Velocity Electron-Beam Scanning.—Rose & Iams, **205** & **708.**
Diavisor—New Type of **Pick-Up** Tube.—Scophony, **2335.**
R.C.A. Television Field **Pick-Up** Equipment.—Smith, **1502.**
Television Transmitting Tubes [Mosaic-Type **Pick-Ups**]: Manufacture in France.—Tarbès, **707** & **2669.**
Pick-Up Tubes : see also Electron-Bombardment, Electron-Optics, Emitron, Iconoscope, Secondary.
New Apparatus for **Picture** Telegraphy.—Reche, **1525.**
Pictures by Wire [Survey], **722.**
Influence of Hindered Rotation and Anisotropy of Internal Field on **Polarisation** of Liquids.—Peterlin & Stuart, **216.**
Polarisation : see also Kerr-Effect.
Electric and Photoelectric Properties of Very Thin Layers of **Potassium** on Glass.—Maciuc, **3106.**
Conductivity of **Potassium Halides.**—Brennecke, **2342.**
Introduction to Television **Production.**—Lubke, **1944.**
Radio **Progress** during 1939, **3095** & **3096.**
New **Projection System** for Large-Screen Television Receivers, **4363.**
Scophony **Pulse** Generator, **1939.**
Pulse : see also Generator, Mixing, Square-Wave.
Quality : see Spot.
Television **Range-Finders.**—Goldsmith, **2321.**
Raster Shapes : see Cathode-Ray.
Receivers.—Allocchio, Bacchini, **1943** (Type TV1); Brown, **1494** & **2658** (British); Fink, **704** (for the Home); Goldsmith, **3952** (using Electrostatic Deflection); Heller, **1123** (for London & Paris Transmissions); Herold, **235** (Superhet. First Detector); Köpping, **703** & **1124** ("Unit" R.); R.M.A., **237** (Marking of Controls); Sherman, **3091** (using 3-Inch Kinescope); Wolcott, **3951** (Characteristics).
Receivers : see also Alignment, Book-Review, Deflection, "Kipp," Projection, and below.
British Standard Specification for Anti-Interference Characteristics and Performance of Radio **Receiving** Equipment for Aural and Visual Reproduction, **3502.**
Reception of Television Images [Survey].—Adam, **1493.**
Television **Reception** and Television Receiving Valves, **1946.**
Effects of Double **Refraction** in Liquids, due to Supersonic Waves.—Lucas, **1524.**
Correction to Equation in "New Hard-Valve **Relaxation** Oscillator."—Black, **2332.**
500-Megacycle [Frequency-Modulated] Radio-**Relay** Distribution System for Television.—Kroger, Trevor, & Smith, **3938.**
Television **Relayed** [using Micro-Waves and Frequency Modulation].—Peck, **3087.**
Resolution : see Lines, Selective-Sideband.
Television Transmitting Equipment of EIAR in **Rome.**—Schunack, **230.**
High-Voltage Power Supply with Complete **Safety** Features.—Rosenblatt, **2659.**
New **Scanning** Oscillator.—Gramophone Company, **2331.**
Scanning : see also After-Glow, Interlaced, Nipkow, Slit, Sweep-Linearity.
Skiatron: New **Scophony** Development for Large-Screen Projected Pictures.—Rosenthal, **2328** & **3501.**

Phototelegraphy and Television—

Fluorescent **Screen** replaced by Totally Reflecting Prism carrying Particles of Carbon or Mica which move under Action of Cathode Ray, **2330.**
Halation on Kinescope **Screens.**—Baker, **3955.**
Production Colour-Analysis of Kinescope **Screens,** *and* Optimum Efficiency Conditions for White Luminescent **Screens** in Kinescopes.—Perkins: Leverenz, **3956.**
Screens: see also Fluorescent.
Direct Measurement of **Secondary** Electron Output from Insulators [in Development of Image-Converter Pick-Up Tubes], *and* **Secondary** Emission from Films of Silver on Platinum.—Heimann & Geyer: Hastings, **2668.**
Method for Determining Charging Potential of Dielectrics and Lower Limit of **Secondary** Electron Emission from Monocrystal of NaCl.—Kirvalidze, **3963.**
Secondary Emission from Thin Dielectric Layers.—Korshunova & Khlebnikov, **1505.**
Secondary-Electron Emission under Action of Two Electron Beams.—Kushnir & Milyutin, **210.**
Conference on **Secondary-**Electron Emission and Photoeffect.—Mazover, **1109.**
Nature of the **Secondary** Emission from Composite Cathodes.—Morgulis, **1504.**
Secondary Electron Emission of Tungsten, Copper, and Iron at High Voltages, *and* **Secondary** Emission from Evaporated Nickel and Cobalt.—Rakov & Antonov: Wooldridge, **1506.**
Secondary-Emission Valves as Amplifiers.—Saic, **1119.**
Mechanism of **Secondary** Electron Emission.—Suhrmann & Kundt, **709.**
Secondary-Electron Emission from Thin Dielectric Layers.—Vudynski, **211.**
Secondary Emission: see also Composite, Electron-Multipliers, Photocells, and under "Valves and Thermionics."
Television Detail and **Selective-Sideband** Transmission.—Goldmann, **691.**
Selective-Sideband Transmission in Television [Reproduction of Detail].—Kell & Fredendall, **3477.**
Investigations of **Selenium** Photoelement.—Becker, **1115.**
Selenium in Canada.—Byers & Lakin, **718.**
Crystallisation by Pulverisation [in connection with **Selenium**].—Dekeyser & Prins, **213.**
Manufacture of [**Selenium**] Barrier-Layer Photocells: New British Industry.—Electro-Physical Laboratories, **3970.**
Filters for Adjusting Spectral Sensitivity of **Selenium** Photocell to Sensitivity Curve of Eye.—Fridland, **2677.**
Changes in Internal Resistance of **Selenium** Barrier-Layer Cells caused by Light.—Sandström, **2349.**
Selenium: see also Book-Review, Foils.
Photovoltage at Element Metal/**Semiconductor**/Metal.—Mönch, **214.**
External Photoelectric Effect in **Semiconductors.**—Cashman, **3497.**
Semiconductors: see also Cuprous-Oxide, Luminescent.
Sensitisation of Photoelectric Surfaces by Electric Discharges in Water Vapour and Atomic Hydrogen.—Tykociner, Kunz, & Garner, **2344.**
Effect of Deuterium and of Electric Discharges in Deuterium Oxide on **Sensitisation** of Photoelectric Cells.—Tykociner & Bloom, **2345.**
Sensitisation: see also Photocathodes, Zinc.
Separating Vision and Sound Signals.—General Electric, **3958.**
Separating Sync. Pulses and Picture Signals in Television Receivers.—R.C.A, **4367.**
Separating Filters.—Piloty, **224.**
Sideband: see Selective, Signal-Frequency, Single, Transient, Vestigial.
Television **Signal-Frequency Circuit** Considerations [for U.S.A. Standards].—Mountjoy, **692.**
Nature of Anomalous Physical [Light-Absorption] Properties of Thin **Silver** Films.—Ashtcheulov, **1950.**
Contact Difference of Potential between **Silver** Films on Glass and Rocksalt.—Anderson, **712.**
Work Functions of Different Faces of **Silver** Single Crystals.—Farnsworth & Winch, **1518.**
Contact Potential Difference between **Silver** and Oxygen-Caesium Surfaces.—Kushnir, Veinrib, & Goncharov, **2676.**
Photovoltaic Cells with **Silver**/Silver-Bromide Electrodes: Optical Sensitising by Dyes.—Sheppard & others, **3105.**
Optical Properties of Evaporated **Silver** Films.—Strong & Dibble, **2337.**
Theoretical Analysis of **Single-Sideband** Operation of Television Transmitters.—Nergaard, **226.**
Effect of Quadrature Component in **Single-Sideband** Transmission [particularly in Picture Telegraphy].—Nyquist & Pfleger, **1953.**
Skiatron: see Scophony.
Correction of Distortion due to Optical **Slit.**—Kharkevich, **1512.**
Photoelectric and Optical Properties of **Sodium** and Barium.—Maurer, **3107.**
Sound Motion Picture **Films** in Television: Part IV.—Maurer, **696.**
Influence of Distribution of Light in **Spot** on Quality of Image transmitted by Television.—Mandel, **690.**
Square-Wave Harmonics.—Herr, **3959.**
Stereoscopic Television Reception with von Ardenne Large-Surface Light Relay.—Gröttrup, **1100.**
Stereoscopic: see also Film.
Superheterodyne Converter System Considerations in Television Receivers.—Herold, **139** & **1491.**
Supersonic: see Diffraction, Refraction.
New Method for determining **Sweep Linearity.**—Seeley & Kimball, **1514.**
Television at **Swiss** National Exhibition, 1939.—Müller, **2664.**
Discussions on "Problem of **Synchronisation** of Television Receivers" and "Influence, on Form of Television Signals, of Conditions of Employment of Equipment."—Mandel: Delvaux, **2662.**
Production of **Synchronising** Pulses for Interlaced Scanning according to "Auxiliary Signal" System.—Schunack, **222.**
Loss Angle of Voltage-Regulated Capacitance [for **Synchronising-**Signal Regulation, etc.].—Thon, **223.**
Synchronising: see also Fundamentals, Generator, Pulse, Separating.
Tartaric Acid: see Crystals.
Two-Way Television over **Telephone Lines:** Particulars of German Service].—Adam, **1500.**
Television over **Telephone Lines.**—West, **3482.**
Telephone Lines: see also Cables, Wire.
Television.—**2320** (Big-Name Talent may "Freeze" T. Advance); **3093** (and Export Market during War); **3947** (T. and the F.C.C.); **4360** (Progress in Studio Technique); Bell, **233** (Address to Cinema Exhibitors); Goldsmith, **701, 1495,** & **1945** (T. Economics); Griffis, **3488** (Paramount Pictures' Views on T.); Jarvis & Seaman, **3097** (Essential Characteristics of T. Circuits); Kersta, **2655** & **3487** (Business Side); Lye, **3486** (Search for a Technique); Michlnickel, **702** (Liesegang's Work, 50 Years Ago); Potter, **2315** (Advance in T: Philco Demonstrations); Preisman, **1495** (Unusual Features of Our T. System); Protzman, **3484** (Studio Technique of N.B.C.); Schröter, **232** (Present State); Town, **4358** (Review of Development, Present Status); Tremain, **3094** (Review of Recent Progress).
Television: see also Airplane, Background, Broadcasting, Cables, Colour, Committee, D.C., Film, France, French, Frequency-Band, Frequency-Modulation, Fundamentals, German, Gradation, Italy, Lines, Mobile-Unit, Optics, Pick-Up, Production, Progress, Receivers, Safety, Stereoscopic, Synchronisation, Telephone-Lines, Transatlantic, Transmitter.
Application of **Tensor Concept** to Complete Analysis of Lumped, Active, Linear Networks.—Epstein & Donley, **694.**
Testing: see Alignment, Generator.
Development of 20-Kilowatt Ultra-High-Frequency **Tetrode** for Television Service.—Haeff, Nergaard, & others, **229.**
Thallous Sulphide Photo-E.M.F. Cell.—Nix & Treptow, **716.**
Time-Base: see "Kipp," Relaxation.
Transatlantic Reception of London Television Signals.—Goddard, **697.**
Transient Response in Television.—Kallmann, **227.**
Transmitters: see Amateur, Rome, Single-Sideband.
Valves: see Reception, Secondary, Tetrode, and under "Valves & Thermionics."
Vector-Response Indicator.—Loughlin, **3504.**
Vestigial-Sideband Filter for Use with Television Transmitter.—Brown, **228.**
New Type of D.C./A.C. **Vibrator** Inverter.—Kiltie. **3092.**
Voltage Dividers for Extended Frequency Ranges.—Everest, **3954.**
Dark Current of **Willemite** Crystal.—Herman & Hofstadter, **3100.**
Behaviour of **Willemite** under Electron Bombardment.—Piore & Morton, **1948.**
Berlin **Wire-**Television Network, 1939/1940.—Lipfert, **2319.**
Evolution of Methods of Transmission by **Wire.**—van Mierlo, **2651.**
Two-Way Television over Single Pair of **Wires.**—Zworykin, **3481.**
Thermoelectric Methods for Determination of **Work Functions.**—Fleming & Henderson: Goss & Henderson, **710.**
Work Functions: see also Silver, and under "Valves & Thermionics."
Photoconductivity in **Zinc Silicates** [with & without Manganese Activator].—Hill & Aronin, **3493.**

MEASUREMENTS AND STANDARDS

Absolute Electrical Measurements.—Hartshorn, **1155.**
New Method of Calculating **Absorption** with Drude-Coolidge Measuring Arrangement.—Slätis, **1126.**
Visual **Alignment** Generator [for Developmental Work on Receivers].—Mayer, **2683.**
Lock-In **Amplifier** for Alternating-Current Measurements.—Michels & Curtis, **3530.**
Amplifier for D.C. Galvanometers.—Sear, **2697.**
Amplification, Amplifiers: see also Photocell-Current, Square-Wave.
Magnet System with Variable **Astatic** Arrangement.—Tagger, **2698.**
Attenuation: see Cables.

Measurements and Standards—

Balancing of D.C. Clicks [in Telephone Receiver].—Sakamoto, **3528.**
Beat Notes in High-Frequency Calibration.—Stansel, **1129.**
Bolometers for Short Electric Waves.—Klumb, **2679.**
" Les Mesures en Radioélectricité " [**Book Review**].—Abadie, **1557.**
" Electrical Measurements and Measuring Instruments " [**Book Review**].—Golding, **4000.**
" Appareils de Mesures électriques " [**Book Review**].—Palm, **1556.**
" Physico-Chemical Methods " [**Book Review**].—Reilly & Rae, **3514.**
" Quartz Oscillators and Their Applications " [**Book Notice**].—Vigoureux, **1535.**
Bridges.—Accuracy, see Resistors; Unskilled Operation, see Deflecting; Astbury, **1547** (Balance Detectors for A.C. Bridges); Curtis & Hartman, **4385** (Dual B. for measurement of Inductance in Terms of Resistance & Time); Hoadley, **1138** (Science of Balancing); Hübner, **2696** (B. for Dry Cell Measurements); Itigo, **1967** (New Type of H.F. Bridge); Kalmus, **1548** (Stabilised B. Circuit); Patterson, **3992** (Work's Method of balancing Kelvin Double Bridge); Santoro, **2372** (Wien B. applied to Distortion Measurement); Seeley, **1968** (Summary of B. Networks).
Broadcast : see Field-Intensity, Selectivity.
Measurements of Attenuation in **Cables** for Very High Frequencies.—Zin, **1131.**
Cables : see also Coaxial.
Measurement of **Capacitance.**—Astbury, **1966.**
Capacity Measurement with String Electrometer.—Tagger, **1141.**
Cathode-Follower : see Voltmeter.
Absolute Calibration of Sphere Spark Gaps with **Cathode-Ray Oscillograph** as Null Instrument.—Berger & Robinson, **3114.**
Judgment and Objective Comparison of Measuring Efficiency of **Cathode-Ray Oscillographs.**—von Borries & Ruska, **2684.**
Cathode-Ray : see also Alignment, Network-Analysis, Selectivity-Meter, Valves, Vector-Response, Voltages.
" Telephone **Clock** "—Marrison, **2362.**
All-Electric **Clock.**—Vigoureux & Stoakes, **3524.**
Clocks : see also Spark.
Measurement of **Coaxial** Transmission Constants of Lines in Decimetric-Wave Region.—Kaufmann, **2681.**
Measurement of Coefficient of Attenuation of **Coaxial** Cables at Ultra-High-Frequencies.—Malatesta, **725.**
Measurement of **Coercive** Force.—Neumann, **1555.**
New Type of **Coil** Tester.—Dickinson, **1148.**
Coil Chart for Quick Reference.—Gallagher, **247.**
Tables and Nomograms for Calculation of **Coils.**—Lang, **248.**
Apparatus for Determining Number of Turns in **Coils.**—Metropolitan-Vickers, **3993.**
Electrical Stability of Tubular Inductance **Coils** with Deposited Conductors.—Thomas, **3120.**
Testing of **Coils** for Short-Circuited Turns.—Vitenberg, **3117.**
Coil for Use at Radio Frequencies.—Ward & Pratt, **246.**
Coils : see also " Q," and under " Subsidiary Apparatus."
Two New Electrical Measuring Instruments: **Compensator** and Voltage-Divider.—von Steinwehr, **3535.**
Variable Air **Condensers :** Determination of Their Residual Parameters.—Proctor, **3121.**
Condensers : see also Dielectric, Electrolytic, Power-Factor, Relaxation.
Conductance Measurement using Rectification.—Rohde & Opitz, **1128.**
Anomaly in Electrical **Conductivity** of Concentrated NaCl Solutions in Region of Decimetric Waves.—Malov, **2682.**
Method of measuring Electrolytic **Conductivity** at High Frequencies.—Stipe & Purks, **747.**
Papers on **Coupling** Theorem for Ultra-High-Frequency Circuits.—King, **724** & **2351.**
Extended Variable Frequency **Crystal** Control.—Goodman: Hayes, **3124.**
Beat-Frequency **Crystal** Oscillator.—Koga & Yamamoto, **3981.**
Behaviour of **Crystal Detectors** with Very Short Waves.—Klumb & Koch, **242.**
Decoupling of Two Measuring Circuits.—Poleck, **3140.**
Deflecting Instrument for Use in A.C. Bridge Networks.—Hampton, **4386.**
Detector : see Bolometer, Crystal.
Wave Form in **Dielectric** Power-Factor Measurements.—AIEE, **3512.**
Effect of Electrodes on Measurement of **Dielectric** Losses.—Asami & Ogawa, **750.**
Dielectric Losses in High-Frequency Fields, and Debye's Theory.—Filippov, **1959.**
Condenser for Testing of Liquid **Dielectrics.**—Hartshorn & Rushton, **753.**
Measurement of **Dielectric** Loss at Ultra-High Frequencies.—Morita, **1530.**
Measuring Method of H.F. **Dielectric** Loss Angles at Higher Temperatures, *and* Temperature Characteristics of H.F. **Dielectric** Loss Angles.—Okazaki & Itijo, **1532.**
Dielectric Research at Ultra-High Frequencies with New Method.—Roberts & von Hippel, **3508.**
High-Frequency **Dielectric-**Loss Measurement by Varying-Gap Method.—Sakamoto & Uno, **1531.**
Dielectric : see also Bridge, Dielectric-Constant, Insulator, Refractive, Voltmeter, Wave-Guide.
Determination of **Dielectric Constants** of Liquids at Radio Frequencies.—Davies & Jones, **3976.**
Absolute Method of Measurement of **Dielectric Constant** and Losses in Liquids, for Decimetric Waves.—Divilkovsky, **1960.**
Dielectric Constants of Ammonia, Nitrogen, and Carbon Dioxide at Ultra-High Frequency.—Fox & Ryan, **1125.**
Dielectric Constant of Diamond.—Groves & Martin, **3133.**
Transmission-Line Method of Measuring **Dielectric Constant** of Gases and Water Vapour at Ultra-High Frequencies.—Hagen, Distad, & Iseley, **3975.**
Dielectric Constant of Water Vapour at 42 Megacycles.—Tregidga, **726** & **2355.**
Experimental Condenser for Determination of **Dielectric Constants** of Liquids.—Williams & Copeland, **2356.**
Dielectrometer : Instrument for measuring Conductances and Dielectric Properties at 100 Megahertz.—Hollway, **3510.**
Diode : see Frequency-Changer.
Dispersion and Absorption of Electric Waves in Alcohols and Aqueous Solutions [Absolute Measurement].—Slevogt, **754.**
Distortion Measurements by Fundamental-Suppression Methods.—Hewlett & Packard, **3988.**
Distortion Meter for Telegraphic Signals and Relay Testing by Stroboscopic Method.—Schiweck, **3527.**
Distortion : see also Bridge, Phase, Rectifier.
Drude : see Absorption, Lecher-Pair.
Materials with Special Temperature Coefficient of Modulus of **Elasticity.**—Fahlenbrach & Meyer, **2363.**
Use of **Electrets** in Electrical Instruments.—Gemant, **1961.**
Measurement of High-Frequency Loss Angle of **Electrolytic** Condensers.—von Kilinski, **746.**
Construction and Operation of Simple Form of Vacuum **Electrometer.**—Backhurst, **263.**
Electrometer Triode and Applications.—van Suchtelen, **1970.**
Measurements by **Electrometer** Triode.—Thaes, **745.**
Apparatus for Measuring Impedance of Rediffusion **Feeders.**—Meerovich & others, **3113.**
Direct-Reading **Field-Intensity** Meter for Measurements of Radiation from Broadcast Antennas.—Christiansen, **728.**
Field-Strength Measuring Equipment at 500 Megacycles.—George, **3973.**
Field-Intensity, Strength : see also Sphere.
Fluxmeter : see Power.
Simple **Freqmeter-**Monitor.—Britt, **250.**
Precision Crystal **Frequency** Standard using 1000-kc/s Crystal for General Amateur Measurement.—Brown, **3982.**
Precision **Frequency-**Meter of Range 0 to 2000 Mc/s.—Essen, **4379.**
Frequency Monitor [particularly for Relay Broadcasting Stations].—Glerum, **1540.**
All-Wave **Frequency** Meter.—Habermann, **1132.**
Frequency Meter on Compensation Principle.—Kaden, **736.**
Frequency-Metering Receivers.—Latmiral, **3122.**
Indicating **Frequency** Meters.—Lübeck, **2693** & **2694.**
High-Precision **Frequency** Comparisons.—Meacham, **4380.**
Measuring and Recording **Frequency** Error of A.C. Power Supplies.—Moreil & Oman, **2358.**
Limits of Inherent **Frequency** Stability.—Roberts, **3515.**
Standard-**Frequency** Transmissions of P.T.R. by Deutschlandsender.—Scheibe, Adelsberger, **3129.**
Recording of Standard **Frequency** of 1000 c/s at Geodesic Institute at Potsdam.—Uhink, **3523.**
Frequency : see also Beat-Note, Clock, Freqmeter, Internal, Multivibrator, Negative-Feedback, Oscillator, Pitch, Switching, and below.
Diode as **Frequency-Changer** for Measurements at Ultra-High Frequencies.—Gainsborough, **243.**
Measurement of Frequency Excursion in **Frequency Modulation.**—Bosse, **2354.**
Method of measuring Frequency Deviation [of **Frequency Modulator**].—Crosby, **3516.**
Sensitivity, Resolution, & Efficiency of Moving-Coil **Galvanometers.**—Cartwright, **1545.**
Direct and Semi-Direct Determination of Critical Resistance of Moving-Coil **Galvanometers.**—Gerszonowicz, **3139** & **3995.**
Portable Multi-Reflection **Galvanometer.**—Pye, **3138.**
Galvanometers : see also Amplifier, Astatic.
Generator for Radio Testing.—General Radio, **2353.**
Signal **Generator** Type TF.517A [150–300 Mc/s].—Marconi-Ekco, **3979.**
Generators : see also Signal, Square-Wave.
Measurement of **Harmonic** Content of Alternating Voltages.—Moerder: Klewe, **2373** & **3142.**
New Method of determining Per Cent. **Harmonics.**—Thomson, **1145.**
High-Accuracy **Heterodyne Oscillators.**—Slonczewski, **4382.**
High-Tension Meter for 600 Kilovolts [Attracting Force measured by Ultra-Micrometer Device].—Rogowski & Böcker, **2376.**

Measurements and Standards—

Radio-Frequency **High-Voltage** Phenomena.—Alford & Pickles, **1130** & **1956.**
Humidity Effect on Loss Angle of Insulator at High Frequencies.—Miura & Kambara, **751.**
Vector-Type **Impedance** Analyser.—Godet & Meahl, **1147.**
New Method for Measurement of Ultra-High-Frequency **Impedance.**—Seeley & Barden, **4377.**
Parallel-T Circuit for measuring **Impedance** at Radio Frequencies.—Sinclair, **255.**
Impedance : see also Feeders, Power-Factor, and below.
Constant-Loss **Impedance-Transforming** Network.—Daven Company, **256.**
Circuit Constants for Production of **Impulse** Test Waves.—Eaton & Gebelein, **4389.**
Recent Developments in **Impulse-**Voltage Testing.—Foust & Rohats, **3533.**
Impulse : see also Square-Wave.
Short-Wave **Inductance** Chart.—Everett, **2689.**
Inductances : see also Bridge, Coil, Mutual, Polystyrene.
Induction Balance : see Sphere.
Contribution to Theory of **Inductive Heating.**—Divilkovsky, **1957.**
Equipment for Testing Electric **Insulating** Materials for Dielectric Strength.—Morgan, **245.**
New Technical Measuring Equipment for testing **Insulating** Materials.—Poleck, **3132.**
Proposed Rules for Electrical Tests on **Insulating** Materials.—VDE, **752.**
New Method for Measurement of Discharges on Porcelain **Insulators.**—Arman, **1149.**
Insulators : see also Dielectric, High-Voltage, Humidity, Impedance-Analyser.
Design and Test of Equipment by **Intermodulation** Method.—Hilliard, **3987.**
Internal Friction in Solids.—Zener, **1539.**
Internal Strains and Magnetism.—Becker, **1538.**
Resistance Measurements on **Iron Wires** in Frequency Range 10^7 to 3×10^8 c/s.—Strutt & Knol, **1526.**
Lagometer for Time Measurements on Relays.—Bryan, **3994.**
Propagation Velocity of Electromagnetic Waves along Two-Wire Circuit [**Lecher Pair**] in Inhomogeneous Medium.—Malov, **1127.**
Contact-less Fine Tuning of **Lecher-Wire** System.—Santo Rini, **1529.**
Lecher Wires : see also Coupling, Dielectric-Loss, Oscillator, Parallel, Transmission-Lines, Voltmeter, Wave-Guides, Wires.
Vacuum-Tube Circuit to Measure the **Logarithm** of Direct Current.—Meagher & Bentley, **741.**
Differential Arrangement enabling **Magnetic** Permeability of Very Small Samples of Substance to be Demonstrated and Measured.—Colombani, **1551.**
Influence of **Magnetic** Field on Electrical Conductivity of Bismuth Single Crystals at Low Temperatures.—Davydov & Pomeranchuk, **3131.**
New Method of Measuring **Magnetic** Permeability of Iron and Permalloy in Very Weak Magnetic Fields.—Loshakov, **2365.**
Electron-Beam Device for Measurement of **Magnetic** Fields between 1–30 Gauss.—Rose, **1554.**
Magnetic Measurements on Long Rods made of Steel and New Alloys.—Schmidt-Glenewinkel, **254.**
Resistance Change of Thin Bismuth Films in **Magnetic** Fields.—Yamaguti, **1553.**
Magnetic : see also Astatic, Coercive, Conductivity, Internal, Sphere, and below. Also under "Subsidiary Apparatus & Materials."
Induction **Magnetograph** [Applicable to Ionospheric Research].—Nagaoka & Ikebe, **271.**
Moment-Free Field Coil for **Magnetometer** Measurements.—Steinhaus & Kussmann, **2366.**
New **Magnetometric** Instrument with Compensation.—Valle & Tribulato, **1552.**
Magnetostriction Oscillators.—Stenning, **2364.**
Magnetostriction : see also Elasticity.
Measuring Instruments : Noteworthy Developments of Past Year.—Archer, **268.**
Equipment for Testing Cases of **Measuring Instruments** against Dust and Rain.—Razumovski, **1975.**
Electrical **Memory System** for Rapid Null Measurements.—Bentley, **3529.**
Meters : see Decoupling, Electrets, Frequency, Measuring-Instruments, Micro, Midget, Milli, Moving-Iron, Optical-Devices, Phase, Power, Rectifier, Retroaction, Scale, Selectivity, Switching, Voltmeter, Wattmeter.
Note on D.C. Amplifying **Microammeter.**—Langer & Curie, **3119.**
Midget Meters for Special Purposes, **2699.**
Thermionic **Milliammeter** for Radio-Frequency Currents.—Mouzon, **3112.**
Direct-Reading Vacuum-Tube **Millivoltmeter.**—Lyons & Heller, **742.**
Compensation of Temperature Errors in **Millivoltmeters :** Study of Swinburne Method for Minimum Energy Loss.—Miller & Underhill, **266.**
Moving-Iron Precision Measuring Instrument.—Toeller, **267.**
Mechanism of Operation of **Multivibrator.**—Hukata & Orihara, **3984.**
Theory of Absolute Standard of **Mutual Inductance.**—Snow, **3985.**
Carey-Foster Method of Measuring a **Mutual Inductance** in Terms of Capacity.—Tyler, **2367.**
Negative Feedback applied to Oscillators [for Frequency Stabilisation].—Sabaroff, **3978.**
Some Applications of **Negative Feedback,** with Particular Reference to Laboratory Equipment.—Terman & others, **244.**
Oscillographic Technique for Measurements in **Network Analyser.**—Myers & Clothier, **265.**
Instruments and Methods of Measuring Radio **Noise.**—Aggers, Foster, & Young, **1962.**
Bridged-T and Parallel-T **Null Circuits** for Measurements at Radio Frequencies.—Tuttle, **1549.**
Null-Measurements : see also Balancing, Bridge, Cathode-Ray, Memory.
Survey of **Optical Devices** used in Meters and Measuring Instruments.—Ockenden, **3137.**
Geometry of **Optical Indicators.**—Dejuhasz, **1974** & **3996.**
Oscillating System with Small Losses.—Bunimovich, **1533.**
Frequency Stability of **Oscillators** with Negative Differential Transconductance.—Faulstich, **734.**
Variable **Oscillator** for Ultra-High-Frequency Measurements.—King, **723.**
Continuously Variable **Oscillator** for Parallel-Line Measurements at 100 to 1000 Megacycles.—King, **4374.**
Theory of Frequency-Controlled **Oscillators.**—Sabaroff, **4381.**
Frequency Variations in Self-**Oscillator** due to Space-Charge, *and* Deviation of Frequency of Valve **Oscillator** from Natural Frequency of Circuit.—Sakamoto : Shembel, **1133.**
Ultra-High-Frequency **Oscillator** Frequency-Stability Considerations.—Seeley & Anderson, **3977.**
Band-Edge Locator : 100 kc/s Crystal-Controlled **Oscillator** with Multivibrator and Amplifiers.—Tibbetts, **251.**
1000 c/s **Oscillator** free from Grid Current and with 5 c/s Frequency Adjustment by Phase Rotation in Feedback.—Zaiser, **2357.**
Oscillators : see also Crystal, Generator, Heterodyne, Magnetostriction, Negative-Feedback, Piezo, Quartz, Square-Wave, Wavemeters.
Panoramic Reception.—Wallace, **3526.**
Input Impedance of H.F. **Parallel-Wire** Transmission Lines immersed in Absorbing Medium.—Banerjee, **3507.**
Theory of Coupled **Parallel-Wire** Systems.—Usui, **4375.**
Measurements of High-Frequency **Permeability** [1–10 Mc/s].—Jackson, **4378.**
Method of Measuring **Phase Difference** between Two Frequencies, particularly for Distance Determination.—Lyubchenko, **1136.**
Methods and Apparatus for measuring **Phase Distortion.**—Levy, **257** and **2370.**
Phase-Meters : see Switching, Vector-Response.
Limiting Sensitivity of Alternating-Current Method of **Photocell-**Current Amplification.—Johnson & others, **1142.**
Piezo-Oscillators with Neutralisation of Quartz.—Boella, **731.**
Piezoelectricity of KH_2PO_4, *and* Specific-Heat Anomaly of KH_2PO_4 at Upper Curie Point.—Lüdy : Bantle, **733.**
Piezoelectric : see also Book-Review, Oscillator, Quartz, Rochelle, Tourmalin.
High-Precision Checking of Standard **Pitch** Note, *and* Continuous Broadcast of Standard of Musical **Pitch** Inaugurated.—Madella : Nat. Bureau of Standards, **737.**
Polystyrene Applied to Radio Apparatus.—Harvey & Carlson, **735.**
Precision Four-Dial Vernier **Potentiometer.**—Tinsley, **3998.**
Review of Design and Use of **Potentiometers.**—Gall, **269.**
Use of Thermocouple and Fluxmeter for Measurement of Average **Power** of Irregular Waves, *and* Grassot Fluxmeter as Quantity Meter.—Dunn, **1143.**
Measuring Radio-Frequency **Power** Output.—Ebel, **280.**
Radio-Frequency **Power** Measurement.—Honnell, **2687.**
High-Frequency Real-**Power** Meter.—Siemens & Halske, **3134.**
New Method of Measuring **Power Factor** of Water.—Morita, **3509.**
Circuit for Rapid Measurement of **Power Factor** of Condensers.—Walker, **3986.**
Power-Factor : see also Dielectric, Rho-Meter.
Protective Arrangements for Measuring Instruments.—von Brockdorff, **755.**
New Radiation **Pyrometer.**—Strong, **1152.**
Potentiometer Circuit for Portable Optical **Pyrometer.**—Machler, **1153.**
Optical **Pyrometer** for General Use.—Hagedoorn, **1154.**
"Q" Measurements : Home Measurement of Coil Merit Factor.—Stafford, **1543.** See also Quartz, below.
Quartz.—Baldwin, **3127** & **3520** (Q. Crystals : General Treatment) ; Brown, **3519** (Oscilloscope Patterns of Damped Vibrations, & "Q" Measurements with Damped Waves) ; Builder, **3125** (Determination of Equivalent Electrical Constants) ; Cady, **3126** (Axes by Etch Figures) ; Hayasi & Akasi, **732** (Quick Building-Up of Electron-Coupled Q. Oscillator) ; Koga, **3517** (Variable-Resistance Device : Frequency Modulation of Q. Oscillator) ; Langevin, **1534** (Absolute Value of Principal Modulus of Q.) ; Mason, **1965** & **3518** (New GT Plate with Low Temperature-Coefficient) ; Rohde, **2360** (Tone-Frequency Control & Filter Qs.) ; Sanders, **2691** (Propagation in Shearing Q. Oscillators);

Measurements and Standards—

Starr, **3123** (Electro-Acoustic Reactions: Partial Plating); Van Dyke, **3126** (Orientation by Etched Sphere); V. Dyke & Thorndike, **2359** (Three-Crystal Method of Measurement).
Quartz : see also Book-Review, Clock, Crystal, Piezoelectric, Vibrations.
Radiation Properties of Different Substances within Temperature Range 250° C to 800° C.—Pirani, **730.**
Adjustments and Tests in Mass Production of Radio **Receivers.**—Stepura, **261.**
Receivers : see also Alignment, Frequency-Metering, Panoramic, Selectivity, Signal, Test.
Sensitive Current- and Voltage-**Recorder** for 50 to 10 000 c/s.—Grave, **2695.**
Dry-Plate **Rectifier** in Measuring Technique.—Grave, **3136.**
Measurement of Currents with Distorted Wave Forms by **Rectifier** Meters.—Grunert & Hueter, **1971.**
Wave-Form Error of **Rectifier** Meters.—Pfannenmüller, **1146.**
Method of determining **Refractive Index** by Microscope.—Chowdri, **3513.**
Relaxation Methods applied to Engineering Problems.—Gandy & Southwell, **738.**
Comparison of **Resistances** of Four Terminal Resistors.—Glynne: Dowling: Gall, **270, 749,** & **1150.**
Temperature-Independent Electrical **Resistances.**—Hildebrandt, **2686.**
Bridged-T Measurement of High **Resistances** at Radio Frequencies.—Honnell: G. W. O. H., **2368** & **3111.**
Natural Unit of **Resistance** and Absolute Definition of Ohm.—Laboccetta, **1156.**
Absolute Measurement of Electrical **Resistance.**—Nettleton, **748.**
Gold-Chromium **Resistance** Alloy for Standard Resistances.—Schulze, **2685** & **3130.**
Standard **Resistors.**—Wenner, **4388.**
Resistance, Resistors : see also Conductance, Iron-Wires, Thévénin, Wattmeters.
Increasing Sensitivity of Measuring Instruments by **"Retroaction."**—Perucca, **1546** & **2374.**
"Rho-Meter" and Use in measuring Power Factors of Valves, Holders, Condensers, etc.—Bogle, **2688.**
Rochelle Salt.—Beevers & Hughes, **3522** (Crystal Structure); Hablützel, **2692** ("Heavy" R.S.); Holden, Mason, & others, **253, 1536,** & **4383** (Heavy-Water R.S.); Mendelssohn, **252** (Specific Heat of Substance showing Spontaneous Polarisation); Mueller, **3128** (Influence of Electrostatic Fields on Elastic Properties); Schulwas-Sorokina, **1135** (Anomalies and Polymorphism); Takagi & others, **3521** (Contour & Thickness Vibrations).
Simplified Multiple **Scale** for Measuring Instruments: Rotoroid Rotating Scale, **3997.**
Measurement of **Selectivity** of Broadcast Receivers.—Moebes, **1137.**
Visual **Selectivity** Meter with Uniform Decibel Scale.—Sturley & Shipway, **4384.**
Sensitivity : see Retroaction.
Electrical **Short-Time** Meters of High Precision.—Tritschler, **1151.**
Signal Generator : RCA "Signalyst."—Rider, **4387.**
Spark Chronograph [for Check on Crystal Clocks].—Marrison, **1537.**
Problem of **Sphere** placed in Homogeneous Alternating Magnetic or Electric Field.—Divil'kovski, **727** & **1958.**
Square-Wave Generator [Adjustable Ratio and Repetition-Frequency (1–7000 c/s): Relaxation Oscillator controlled by Gas-Discharge Triode].—Cossor Company, **3115.**
Generation of **Square-Wave** Voltages at High Frequencies.—Fenn, **3989.**
Square-Wave Generator.—General Radio, **2369** & **3116.**
Square-Wave Analysis of Linear Pulse Amplifiers.—Huntoon, **3531.**
High-Frequency **Square-Wave** Generator.—Parkins & Smith, **3532.**
National **Standards** of Measurement.—Briggs, **1157.**
Standards : see also Pitch.
Substitute for **"Susceptance."**—Nims, **1158.**
Electronic Valves as Controlled **Switching** Devices.—Vecchiacchi, **1541.**
Temperature : see Coils, Elasticity, Polystyrene, Pyrometer, Radiation, Resistances, Wattmeters.
Taylor Universal **Test** Meter Model 90, **4390.**
Thermionic **Test** Set.—Salford Elec. Instruments, **262.**
Precision Current-Transformer **Testing** Set.—Elliott Brothers, **1550.**
Testing : see also Alignment, Generator, Impulse, Intermodulation, Oscillator, Receiver, Square-Wave, Valve.
Graphite/Silicon-Carbide **Thermocouple :** Applications in Ceramic & Other Industries.—Bonnot, **3135.**
Welding of **Thermocouple** Junctions.—Hickson, **3999.**
Discussion on "Determination of Inertia of **Thermocouples.**"—Levitskaja, **2378.**
Compensated **Thermocouple-**Type High-Frequency Instruments.—Tuzita, **2377.**
Special **Thermoelectric** Alloys.—Kalinin & Stepanov, **4391.**
Highly Sensitive **Thermoelement** for Radiation Measurement.—Rosenthal, **2380.**
Metallic Materials for **Thermoelements.**—Schulze, **729.**
Easily Constructed, Rugged, Sensitive **Thermopile,** *and* Vacuum Thermocouple.—Launer: Moore & Webb, **2379.**
Thermocouple, Thermopile : see also Power.
Some Applications of **Thévénin's Theorem.**—Sobolev, **3118.**
New **Time** Standard.—Warren, **1964.**
Time : see also Lagometer, Short-Time, Transit.
Symmetrical Vibration of Free Circular Plate [with Possible Application to **Tourmalin** Piezo-Oscillators].—Hayasaka, **1134.**
Direct Measurement of Group **Transit Time** of Transmission Systems.—Hölzler & Lenth, **1542.**
Theory of Resonance in Micro-Wave **Transmission Lines** with Discontinuous Dielectric.—Lamont, **3506.**
Tuning-Fork maintained by Photocell.—Cambridge Instrument, **1963.**
Tuning-Fork Stabilisation.—Norrman, **2690.**
Ultra-Short Waves: Physics, Technique, and Fields of Application.—Hausser, **1528.**
Measurements of Currents and Voltages down to an **Ultra-Short** Wavelength of 20 Centimetres.—Strutt & Knol, **1527.**
Ultra-Short : see also Absorption, Beat-Notes, Bolometers, Coaxial, Coil-Chart, Conductance, Conductivity, Coupling, Crystal, Dielectric, Dielectrometer, Field-Strength, Frequency-Changer, Generator, Impedance, Iron-Wires, Lecher, Oscillating, Oscillator, Parallel, Resistances, Sphere, Tourmalin, Very-High, Very-Short, Voltmeter, Wave-Guide, Wavemeter, Wires.
New Prefixes for Electrical **Units.**—French Committee, **739.**
Revision of Electrical **Units.**—Crittenden, **3143.**
Electrical Apparatus of **Unit Component** Construction.—Muirhead, **4392.**
Measuring **Valve** Capacities with Signal Generator.—Hygrade Sylvania, **3990.**
Dynamic **Valve** Test Set.—Macfadyen & Day, **258.**
Direct-Viewing Method for Positive-Grid **Valve** Characteristics.—Sawada & Kameyama, **744.**
Simple Method of measuring Signal-Handling Capacity of H.F. **Valves.**—Sloane, **259.**
Measurement of Transmitting **Valve** Characteristics above Dissipation Limit.—Stolzer & Sargrove, **3991.**
Testing Amplifier Output **Valves** by means of Cathode-Ray Tube.—van der Ven, **2371.**
Vector-Response Indicator.—Loughlin, **3525.**
Velocity : see Lecher-Pair.
Electronic and Electrical Measurements at **Very High** Radio Frequencies.—Chipman, **2352.**
Questions of Intensity in Region of **Very Short** Electric Waves [10 mm–0.1 mm].—Klumb, **2680.**
New **Vibration** Platform.—Zakharchevski & Razumovski, **756.**
Torsional **Vibrations** of Crystalline Cylinder.—Brown, **2361.**
Discussion on "Production and Measurement of Small **Voltages** at Radio Frequencies."—Bozzi: Pinciroli, **740.**
Selective Measurement of Very Small Alternating **Voltages.**—Schäfer, **1544.**
New Method of measuring A.C. **Voltages :** Applying Cathode-Ray Oscilloscope to Slide-Back Voltmeter.—Wachtman, **264.**
Voltages : see also Millivoltmeter, and below.
Remarks on Zinke's Paper "Frequency-Independent Capacitive-Ohmic **Voltage Dividers** for Measuring Purposes."—Krutsch, **3141.**
Voltage-Dividers : see also Compensator.
Ultra-High-Frequency **Voltmeter.**—Alford & Pickles, **3110.**
Probe Valve **Voltmeter.**—Andrewes & Lowe: Groom: Harris, **1140, 1972,** & **2375.**
Multi-Range Valve **Voltmeter.**—Cambridge Instrument, **3974.**
Inductor-Type **Voltmeter,** and Modes of Electrical Oscillation of Wire Circuit for Ultra-Short Waves.—Iwakata, **2350.**
Vacuum-Tube **Voltmeter** for Use in Reactance-Variation Method.—Kanno, **3511.**
Advantages of Cathode-Follower Connection for Mains-Driven Valve **Voltmeter** of Very High Input Impedance.—Stephenson, **743.**
Generating **Voltmeter** for Pressure-Insulated High-Voltage Sources.—Trump, **1973.**
Vacuum-Tube **Voltmeter** for Coaxial-Line Measurements.—Usselman, **4376.**
Duo-Triode Bridge **Voltmeter.**—Vollrath, **1139.**
Water, Water-Vapour : see Dielectric-Constant, Humidity, Power-Factor.
Amplifier-**Wattmeter** Combination for Accurate Measurement of Watts and Vars.—Brown & Cahoon, **1144.**
Performance of Electrostatic **Wattmeters.**—Francini: Perucca, **3534.**
Influence of Temperature on Errors of Added Resistance in **Wattmeters.**—de Marco, **1969.**
Use of **Wave Guide** for Measurement of Micro-Wave Dielectric Constants.—Lamont, **4373.**
Wavemeter Type TF.643 [20–300 Mc/s].—Marconi-Ekco, **3980.**
Wavemeter Type R.502 [between 6.5 and 3000 Metres].—Standard Telephones, **4380** *bis.*
Direct-Reading **Wavemeter.**—Straubel. **249.**
Straight-Line Calibration for **Wavemeters** and Oscillators.—Roberts, **3983.**
Measurements with Ultra-Short Electric Waves on **Wires.**—Hartshorn, **1955.**

SUBSIDIARY APPARATUS AND MATERIALS

Gravimetric Study of Lead **Accumulators**.—Denina, **2441**.
Electrolytic and Subsidiary Phenomena in **Accumulators**.—Kriéger, **2442**.
Accumulators : see also Airplane, Voltaic.
Determination of Optimum Voltage for **Airplane** Electric Systems.—Grant & Peters, **451**.
Electric Power for **Airplanes**.—Clardy, **4076**.
Quantum Yield of Optical Transformation of *F'* Centres in **Alkali-Halide** Crystals, *and* Incorporation of Foreign Substances in **Alkali-Halide** Crystals.—Pick : Akpinar, **4407**.
Electric Breakdown of **Alkali Halides**.—Seeger & Teller, **4445**.
Theory of Dielectric Breakdown in **Alkali-Halide** Crystals.—Seitz & Sampson, **2397**.
Alkali-Halides : see also Crystals, Glasses, Ions (**4416**), Potassium, and under "Phototelegraphy & Television."
Alloys.—Dean, **2745** (New A. of Manganese & Copper) ; Hirst, **3614** (X-Ray Powder Photography for As.) ; Köster, Geller, **2758** (Ternary Iron-Cobalt As.) ; Pan, **3205** (Ferromagnetic Gold-Iron As.) ; Pickles & Sucksmith, **3204** (Two-Phase Iron-Nickel As.) ; Scholz, Rabkin, & Morozov, **3203** (Al-Si-Fe As. of Highly Stable Permeability) ; Smith, **1628** & **2744** (Beryllium-Copper & Beryllium-Nickel As.) ; Vonsovsky, **4055** (Heisenberg-Bloch Theory for Binary Ferromagnetic As.). See also Aluminium, Ferromagnetic, Materials, Nickel, Order-Disorder, Resistance, Vicalloy, Viscosity.
"Alsifilm," Artificial Mica, obtained from Bentonite, **338, 2732,** & **3177**.
Magnetic Properties of Iron-**Aluminium** Alloys.—Bozorth, **4052**.
Aluminium for Cable Sheaths.—Deisinger, **4074**.
Aluminium as Material for Cable Sheaths.—Hanff & others, **2056**.
Electrical Welding of **Aluminium**.—Klapsov, **1230**.
Nature of Anodically Deposited Oxide Layers on **Aluminium** Alloys.—Röhrig, **3577**.
Formation of **Aluminium Oxides** in Certain Electrolytes.—Morozov, **330**.
Methods of Pressing **Amber**.—Ignatovich, **819**.
Amplidyne [Motor-Driven Generator giving High Amplification of D.C. Input], **1558** & **2381**.
Direct-Current and Audio-Frequency **Amplifier**.—Black & Scott, **4024**.
D.C. **Amplifier**.—Brubaker, **2403**.
Magnetic Voltage **Amplifier**.—Feldbaum, **4430**.
High-Gain D.C. **Amplifier** for Bioelectric Recording.—Goldberg, **2722**.
Balanced Direct-Current **Amplifier** for Alternating-Current Operation.—Stair & Hand, **4411**.
Amplifiers : see also Gauge, Time-Base.
Amplifier-Choke.—Reuss, **2757**.
Arcs.—Cummings & Tonks, **3582** (Influence of Longitudinal Magnetic Field on Low-Pressure A.) ; Eskin, **315** (Energy of Reigniting As.) ; Fukuda, **4029** (Polarity Effects in Reignition) ; Garbuny & Matthias, **4028** (Variation of Initial Reignition Voltage with A. Current) ; Horikosi, **2003** (Restriking Phenomena : Conclusions regarding Breakdown by Ionisation) ; Kenty, **1590** (As. falling under Gravity) ; Maeker, **1189** (Spectrum of Carbon A.) ; Risch, **3563** (Force on Cathode) ; Suits, **318** & **1588** (Hydrogen & Other As.). See also Glow, Mercury, Plasma.
Time Analysis of **Armature Movement** in Electromagnetic Devices.—Livshits, **4432**.
Apparatus for Generating Current proportional to Given A.C. Effect [e.g. for **Automatic Regulation**].—Bengtsson & Slettenmark, **4413**.
Use of **Ballistic Models** for Study of Energy Exchange Conditions in Velocity-Modulated & Other Devices.—Hollmann, **1574** & **2700**.
Quantitative Study of Clean-Up of Hydrogen by **Barium**.—Johnson, Hane, & Anderson, **776**.
Production of **Barium** and Use in Vacuum Technique.—Gvozdov, **297**.
Recent Advances in **Barium** Getter Technique.—Lederer, **1585**.
Hydrogen-Filled Iron-Wire **Barretter**.—Cole & Dalzell, **1236**.
Beryllium Copper, **1628** & **2744**.
Note on Analytical Representation of **B-H Curve**.—Gatha, **2042**.
Cathode-Circuit Protection [**Bimetallic** Delay Switch], **1235**.
Free Bending of **Bimetallic** Strips of Arbitrary Form.—Laig-Hörstebrock, **1234**.
Thermostatic **Bimetals**.—Eskin & Fritze, **2057**.
Physical Constants of Asphaltic **Bitumens**.—Saal & others, **4070**.
Bituminous Materials and Use in Electrical Industry.—Heilmann, **343**.
"Technische Kunstgriffe bei physikalische Untersuchungen" [Methods & "Tips" : **Book Review**].—von Angerer, **1242**.
"Elektronen-Uebermikroskopie" [Electron-Microscopy : Physics, Technique, & Results : **Book Review**].—von Ardenne, **4402**.
"Ferromagnetismus" [**Book Review**].—Becker & Döring, **2051**.
"Erzeugung von Atom- und Ionenstrahlen" [**Book Review**].—Bomke, **3159**.
"Elektrische Höchstspannung" [**Book Review**].—Bouwers, **296**.
"Annual Reports of Society of Chemical Industry" [**Book Review**], **4448**.
"Die selbsttatige Regelung in der Elektrotechnik" [Automatic Regulators : **Book Review**].—Leonhard, **3186**.
"Fundamental Processes of Electrical Discharge in Gases" [**Book Review**].—Loeb, **3175**.
"The Cyclotron" [**Book Review**].—Mann, **2001**.
"Kunstharzpressstoffe . . ." [Synthetic-Resin Plastics & Other Synthetic Materials : **Book Review**].—Mehdorn, **1601**.
"Hot-Cathode Low-Voltage Cathode-Ray Tube" [**Book Review**].—Mezger, **4008**.
"Electronic Processes in Ionic Crystals" [**Book Review**].—Mott & Gurney, **4444**.
"Einführung in die Theorie der Elektronenoptik" [**Book Review**].—Picht, **1984**.
"R.C.A. Tube Data Handbooks" [**Book Review**], **4396**.
"Cathode-Ray Oscillographs" [**Book Review**].—Reyner, **3544**.
"Fortschritte der Chemie, Physik, und Technik der makromolekularen Stoffe" [**Book Review**].—Röhrs, **2723**.
"Condenser in Communications Technique" [**Book Review**].—Straimer, **331**.
"Procedures in Experimental Physics" [**Book Review**].—Strong, **1941**.
"Modern Physical Laboratory Practice" [**Book Review**].—Strong & others, **4023**.
"Glas" [**Book Review**].—Thiene, **2428**.
"Mechanische Festigkeit von Phenol-Formaldehyd-Kunstoffen" [**Book Review**].—Thum & Jacobi, **818**.
"Texturen metallischer Werkstoffe" [Rapid Development of Knowledge of Their Influence on Magnetic & Other Properties : **Book Review**].—Wassermann, **2452**.
"Semiconductors and Metals" [**Book Review**].—Wilson, **806**.
Electric Strength of Solid Dielectrics in Relation to Theory of Electronic **Breakdown**.—Austen & Whitehead, **2730**.
Breakdown in Compressed Gases at High Pressures and Small Distances.—Blochinzev, **4441**.
Electrical **Breakdown** Strength of Ionic Crystals as Function of Temperature.—Buehl & von Hippel, **831**.
Theory of Electrical **Breakdown** of Crystalline Insulators.—Franz, **348**.
Dielectric **Breakdown** in Ionic Crystals, *and* Remarks on Dielectric **Breakdown**.—Fröhlich : Seeger & Teller, **349**.
Dielectric **Breakdown** in Solids.—Fröhlich, **2024**.
Breakdown Voltage Variation in Hydrogen.—Fucks & Schumacher, **4035**.
Theoretical Determination of **Breakdown** Voltage for Sphere-Gaps.—Meek, **4442**.
Breakdown, Glow Discharge, and Photoelectric Reaction.—Rogowski, **310**.
Reaction by Metastable Atoms and Lowering of **Breakdown** Voltage in Noble Gases.—Rogowski, **1186** & **3567**.
Edge Effect of Electrodes in **Breakdown** of Solid Dielectrics.—Toriyama & Sawa, **2025**.
Breakdown : see also Alkali-Halide, Crystals, Glasses, Spark.
Sealed Glass **Bushings** for Electrical Apparatus.—Hull, Moore, & Doll, **1178**.
Improvements in Construction of Condenser **Bushings**.—Peterson, **1609**.
External Protection of Electric **Cables** by Tarry and Bituminous Materials.—Heilmann, **1619**.
Electric **Cables** and Fire Risks.—Melsom, **2431**.
Cables : see also Aluminium, Screening, Wires.
Selective **Calling Device** for Distant Control by Wireless.—Blasczyk, **2059**.
Oscillograph **Camera**.—Cossor, **4010**.
120 000-Exposure-per-Second **Camera** [Pinhole Type].—Prince & Rankin, **854** & **1238**.
Continuous-Feed **Camera** for Cathode-Ray Oscillographs.—Southern, **4399**.
Capacitor Discharge Chart.—Hanopol, **4060**.
Rapid Measurement of Glass-**Capillary** Diameters.—Glockler & Horwitz, **305**.
Lining of Metal **Capillaries** with Glass and Application to Capillary Positive Ion Source.—Getting & Leighton, **4036**.
Indirectly-Heated **Cathode** for Cathode-Ray Tubes, **4009**.
Cathode-Ray.—Tube for High-Voltage (Special Electrode-Support System), **4006** ; A.E.G., **2707** (Extended Possibilities owing to New Accessories) ; von Ardenne, **1163** (Storage-Type Projecting Tubes) ; Bachman, **1564** (Ring Focusing of Negative Ions in C.R. Beam) ; Batlouni, **1988** (Time-Sweep from Mains) ; Benham, **757** (Transit-Time Effects in C.R. Tubes & Diodes) ; Berger, **1978** (New Double Oscillograph) ; Berger & Robinson, **3145** (as Null Instrument : Errors of C.R.O. as Measuring Instrument, & Their Reduction) ; von Borries & Ruska, **2703** (Measuring Efficiency) and **2705** (High-Performance with Sealed-Off Tube) ; Bradfer, **3147** (Inverse Sweeping : Spot off Screen during Waits) ; de Bruin, **1561** (Applications) ; Burgess, **3539** (Battery-Operated) ; Campe & Matschull, **760** (Recording of Surges as Stationary Curves) ; Cossor, **759** (free from "Wheatcroft Effect"), and **3146** (C.R. Oscillographs, particularly 9-Inch Model) ; Czech, **1987** (Decaying Oscillations as Stationary Images) ; E.M.I., **2387** & **2389** (Maintaining Spot Focus : Accurate Tube Assembly) ; Flechsig, **273** (Electrostatic Deflection with Non-Parallel Plates) ; Fleming-Williams, **1980** (Trapezium Distortion) ; Flowers, **2388** (Automatic, for Light-

Subsidiary Apparatus and Materials—

ning Currents); Friend, **4007** (C.R. Alphabet Machine); Fukuda & others, **761** (External Camera Recording: Efficiencies of Various Screens); Goncharski, **1565** (Gas-Filled C.R. Commutator) and **3543** (Use of C.R. Commutator in Inductor Tele-Compass); Grismore, Gaines, **1560** (Automatic); Hollins, **1561** (Applications); Hollmann, **758** (Ultradynamic Lissajous' Figures); van Liemp & de Vriend, **1167** (Testing of Fuses); Macfadyen (see Cossor); Reusse & Ripper, **3549** (Influence of Space Charge on Focusing); Smyth, **1164** (Implosion); van Suchtelen, **1561** (Applications); Tanaka & Nagai, **1166** (as Algebraic Curve Tracer); Thoma, **1165** & **2386** (New Investigations: Ultradynamic Control, Inversion Spectrograph, etc.); Tronconi & Gianfranceschi, **3541** (Multiple); Veegens, **1162** (General-Purpose Portable Equipment); Vichnievsky, **3147** (Circular Sweep of Radial Deflection); Voges & Ruthermann, **1566** (Increase of Resolving Power of Magnetic Half-Circle Method for Velocity Analysis of C.R.); Westinghouse, **2706** (with Bellows to control Number of Air Molecules).

Cathode-Ray: see also Book-Review, Camera, Cathode, Charged-Particles, Commutator, Direct-Visualiser, Discharge, Electron-Beams, Electron-Microscope, Electron-Optics, Electrons, Films, Fluorescence, Kipp, Mercury, Oscillograph, Oscilloscope, Phosphorescence, Photographic, Potential-Divider, Recorder, Recording, Rectangular, Sweep-Linearity, Switch, Synchronisation, Thyratron, Time-Base, Vacuum, Vector-Response, Window.

Cellulose as Insulating Material.—Kohman, **341**.

Cation Exchange in **Cellulosic** Materials.—McLean & Wooten, **1204**.

Characteristic Data on **Ceramic** Materials at High Frequencies, **2026**.

Standard Apparatus and Procedure for Testing Porosity of **Ceramic** Materials, **2430**.

Ceramic Materials: Physical and Electrical Properties—Continental Observations, **4452**.

Ceramics for Radio-Frequency Use.—Bogoroditski & Fridberg, **335**.

A.C. Resistance of **Ceramic** Materials for Temperatures up to 600°.—Richter, **825**.

Dielectric Loss Factors of **Ceramic** Materials for A.C. at Commercial Frequencies.—Richter, **4453**.

D.C. Resistance of **Ceramics**.—Rögener, **4068**.

Acceleration of **Charged Particles** in Electromagnetic Alternating-Current Field.—Seibert, **2701**.

Calculation of **Chokes** with Superposed D.C. Magnetisation.—Hartel, **355**.

Chokes: see also Amplifier, Coils, Inductor, Iron-Cored, Transducer.

Crimping Tool for **Coaxial Conductors**.—Hey, **1620**.

Mechanism of **Cobalt** Magnetisation.—Shirobokov, **2037**.

Coherers: see Styctographic.

Simultaneous Winding of Four Multi-Turn **Coils** by One Machine.—Garskov, **2063**.

Crosstalk Balancing **Coils** for Type K Carrier System.—Slade, **2457**.

Testing of **Coils** for Short-Circuited Turns.—Vitenberg, **3182**.

Coils: see also Chokes, Iron-Cored, Magnetic-Bias, Magnetic-Field, Permalloy.

Mutual Electrical Energy of Two **Colloidal Particles:** General Theory, using Approximate Debye-Hückel Equation.—Levine & Dube, **2439**.

High-Frequency Electron **Commutator** for Double and Quadruple Cathode-Ray-Oscillograph Observation of Periodic and Aperiodic Processes.—Ladygin & Denisov, **1979**.

Parameters of Modern Cathode-Ray Tubes used in Electron **Commutators** [for Remote Control, etc.].—Zernov, **4395**.

Vacuum-Tube Alternating-Voltage **Compensator**.—Cooter, **4412**.

Insulating **Concretes** with High Insulating Resistance and Dielectric Strength.—Lambert, **2737**.

Condenser for Testing Liquid Dielectrics.—Hartshorn & Rushton, **813**.

Pressure **Condensers**.—de Lange, **1206**.

Self-Induction and Attenuation of Roll-Type **Condensers**.—Leider, **1611**.

Water-Cooled High-Frequency **Condensers** [for Induction Furnaces].—Marbury, **1610**.

Variable Air **Condenser** [for Peak Potentials to 800 V].—Muirhead, **4061**.

Tuning **Condensers** with Linear Action.—Philips Company, **1205**.

Shape of Characteristic Curve of Rotating **Condenser** and Its Influence on Synchronism.—Pitsch, **2437**.

Variable Air **Condensers:** Determination of Residual Parameters.—Proctor, **3179**.

Condensers for Crystal Filters.—Renne & Alekseev, **3180**.

Subdivided Air **Condenser** embodying Split-Insulation Principle.—Yarnold, **3580**.

Condensers: see also Book-Review, Dielectrics, Electrochemical, Electrolytic, Moist-Air, Plastics, Pressure, Resistors, Spark-Over, Sulphur.

Constant Current Sources.—Green & Kuper, **4414**.

Electrical **Contacts** from Powdered Metals, **3185**.

Contact Phenomena in Telephone Switching Circuits.—Curtis, 2062 & **3596**.

Contact Materials: Properties Required: Sintered Silver-Nickel.—Halls, **364**.

Fundamental Points on Metallic **Contacts**.—Holm, **1633**.

Formation of Metallic Bridges between Separated **Contacts**.—Pearson, **363**.

Characteristics of **Contacts**.—Sotskov, **4044**.

Electrical Resistance of Metal **Contacts**.—Went, **1237**.

Unbalanced Bridge **controlling** Operation of Servo-Motor.—Rubin, **4434**.

Electronic **Controlling Devices** without Contacts.—Klyuev, **4435**.

"Rotaceptors" · Efficient **Conversion** of D.C. to A.C., **809**.

Special Type of Step-Up Rotary **Convertor** with Double Commutation, and Applications.—Giulietti, **2382**.

Extremely Bright Spots on **Coolidge-Tube Target**.—Koga & Tatibana: Forman, **277** & **774**.

Copper-Oxide Rectifiers at Audio- and Super-Audio Frequencies.—Renne, Bogdanov, & Meskin, **3572**.

Effect of Temperature on **Copper-Oxide** Rectifiers.—Vitenberg, **2440** & **3192**.

"Specific Quality Coefficient" of **Copper-Oxide** Rectifiers.—Vitenberg, **2751**.

Corona and Ionisation Detection.—Brown & Weston, **306** & **793**.

Initial Intensity of Negative D.C. **Corona** produced between Circular Wire and Plane Parallel to It.—Meer, Morokhovski, & Kaptsov, **2416**.

Onset of Positive Point-to-Plane **Corona** in Pure A N_2, H_2, and in Dry Air.—Weissler, **2417**.

Corrosion Effects on Electrical Machines.—Bätz, **2061**.

Soil-**Corrosion** Studies, 1937.—Logan, **840**.

Causes of **Corrosion** of Fine Copper Wires carrying Potential.—Stephens & Gehrenbeck, **3594**.

Determination of Spectral Sensitivity of Photon **Counter**.—Roich, **2065**.

Accurate Hard-Valve **Counter Chronograph**.—Uppelmann, **1630**.

Counting-Rate Meter.—Evans, Alder, Meagher, **853**.

Determining Orientation of **Crystals** by X-Rays.—Haworth, **2451**.

Propagation of Electron Waves in Ionic Single **Crystals**.—von Hippel & Davisson, **2426**.

Observations and Investigations on **Crystal** Detectors.—Klumb, **1159**.

Longitudinal Vibrations of Ionic **Crystals**, *and* Electric Breakdown of Alkali Halides.—Lyddane, Teller, & others, **3559**.

Three-Electrode **Crystals** with Barrier Layers.—Makovski, **2015**.

Quantitative Carrying-Through of Space-Charge and Border-Layer Theory of **Crystal** Rectifier.—Schottky & Spenke, **3190**.

Statistical Domain Theory of Ferromagnetic **Crystals**.—Takagi, **3200**.

Crystals: see also Book-Review, Ferromagnetic, Films, Glasses, Goniometer, Hysteresis, Recorder, Textures, Viscosity.

Effect of **Crystalline Structure** on Properties of Metals.—Boas, **4058**.

Electronic Theory of Crystalline Compounds of **Cuprous-Oxide** Type.—Dressnandt, **4419**.

Photovoltage at Element Metal/Semiconductor/Metal: V—Experiments on Polycrystalline Samples of **Cuprous Oxide** at Low Temperatures.—Mönch, **323**.

Cyclotron of Biochemical Research Foundation, *and* Purdue **Cyclotron**.—Allen: Henderson, **784**.

Constant Current Network for Supplying Power to **Cyclotron** Oscillator.—Allen & Franklin, **2413**.

Cyclotron Ion Source with Retractable Filament.—Curtis, **3560**.

Cyclotron and Applications.—Mann, **2000** & **2001**.

Modified Arc Source for **Cyclotron**.—McMillan & Salisbury, **785**.

Mechanical Model illustrating Principle of **Cyclotron**.—Ward: Jayaraman, **292** & **2702**.

Formation of Ions in **Cyclotron**.—Wilson, **293**.

Ballistic **Demagnetising** Factor for Cylindrical Rods.—Warmuth, **1643**.

Electro-Friction [for **Deposition** of Metal Layer].—Ustraykh, **366**.

Dielectric.—Asami & Ogawa, **828** (Effect of Electrodes on Measurement of D. Loss); Austin & Whitehead: Fröhlich, **4446** (Electrical Strength of Some Solid Ds.); Budó, **834** (D. Relaxation); Cernuschi, **2425** (Critical Field of Solid D.); Fillipov, **2022** (D. Losses in H.F. Fields: Debye's Old & New Theories); Fischer, **835** (D. Relaxation: Structure of Dipole Liquids); Gross, **1602** (After-Effects); Kanonykin, **1598** (Discharge through Air Layers in Solid Ds.); Manning & Bell, **4447** (Conduction, etc., in Solid Ds.); Martin, **2028** (Australian Ds.); Miura & Kambara, **828** (Humidity Effect on Loss Angle of Insulator at H.F.); Moullin, **2023** (Molecular Nature); Simmons, **833** (D. Absorption); Tabaracci, **2429** (Properties of Some Solid Ds.).

Dielectrics: see also Breakdown, Condenser, Electron-Emission, Hysteresis, Insulating, Liquid, Moist-Air, Polarisation, Solutions, Sulphur, Water, and below.

Dielectric Constant in Neighbourhood of Melting Point.—Guillien, **1607**.

Dielectric Loss in Ice [Effect in Open-Wire Lines].—Murphy, **2738**.

Measurements of **Dielectric Losses** of Condensers and Other Components of Radio Circuits.—Bogle, **2741**.

Diffusion of Hydrogen from Water through Steel.—Norton, **4415**.

Direct Visualiser for Two [Non-Recurrent] Transient Phenomena.—Kurokawa & Tanaka, **3540**.

Subsidiary Apparatus and Materials—

Further Progress with New Optical Method for studying Electrical **Discharges.**—Alexander, **2728.**

Spectrum of Torch **Discharge** [zt Very High Frequencies].—Asami & Hori, **1196** & **4033.**

Mechanism of Ignition of Long **Discharge** Tubes.—Bartholomeyczyk, **1587.**

Electrical **Discharge** between Stationary and Rotating Electrode.—Beams & Snoddy, **2007.**

Effect of Magnetic Force on High-Frequency **Discharges** in Pure Gases.—Brown, **3174.**

Subsidiary Electrons produced by Photoelectric Effect in Non-Self-Supporting Hydrogen **Discharge.**—Costa, **309.**

Mechanism of Electrical **Discharges** in Gases of Low Pressure.—Druyvesteyn & Penning, **4030.**

Time-Lag Analysis of Townsend **Discharge** in Argon with Activated Caesium Electrodes.—Engstrom & Huxford, **1596** & **4031.**

Contribution to Electron Emission at Cathode of Glow **Discharge.**—Fischer, **1595.**

Investigations on Gaseous **Discharges,** with Attention to Dynamic Properties and Stability.—van Geel, **1191.**

Influence of Discharge-Chamber Structure upon Initiating Mechanism of High-Frequency **Discharge.**—Githens, **790** & **3171.**

Diffusion of Ions in **Discharge** and Initial Rate of Gas Deionisation.—Granovsky, **1185.**

Transition from Glow **Discharge** to Arc Discharge, due to Short Current Impulses.—Höfert, **308.**

Explanation of Electrical Properties of Alternating-Current High-Pressure **Discharge** from Phenomena at Electrodes.—Kern, **1184.**

Atomphysical Interpretation of Lichtenberg Figures and Application to Study of Gas **Discharge** Phenomena.—Merrill & von Hippel, **1187.**

Investigation on Stepped **Discharge** with Cathode-Ray Oscillograph, *and* Two-Stepped **Discharge.**—Nomoto, **794** & **3565.**

Bearing of Three-Body Collisions on Energy Relations in Gaseous **Discharges.**—Rebsch, **1190.**

Function of Anode Spots in Glow **Discharge.**—Rubens & Henderson, **796.**

Electrical **Discharge** on Liquid Surfaces.—Snoddy, Henry, & Beams, **2729.**

Foundations of Theory of Circuits used with Gaseous **Discharge** Lamps.—Strauch, **307.**

Discharge Delay in Solid Insulating Materials.—Strigel, **1198.**

Theory of Cathode **Discharge** Portions of Low Pressure Discharge.—Weizel, Rompe, & Schön, **311.**

Researches on High-Frequency **Discharge** with External Electrodes.—Zouckermann, **3564.**

Discharges : see also Arc, Book-Review, Breakdown, Capillaries, Corona, Dielectrics, Glow, Hollow-Cathode, Impulse, Ionisation, Mercury, Needle-Point, Points, Polymerisation, Spark.

Re-Ignition Voltage Characteristics of Grid-Controlled **Discharge Tubes.**—Watanabe & Nakamura, **802.**

Dry Batteries without Deterioration, **2753.**

Manufacture of **Dry Batteries.**—Drotschmann, **2754.**

Effect of Iron Content of Manganese Ores on **Dry Cell** Characteristics.—Verman, **2443.**

A.C. Bridge for Measurement of Internal Resistance and Capacity of **Dry Cells.**—Hübner, **2755.**

Dry-Plate Rectifier in Electrical Measuring Technique.—Grave, **3191.**

Rosenberg [Constant-Current] **Dynamo** with Fixed Polarity, **385.**

Unipolar **Dynamos** for Low Voltages and High Currents.—Zorn, **3194.**

Einthoven String-Galvanometer Amplifier System for Investigation of Photovoltaic Effects.—Vanselow, **3599.**

Direct Production of **Electricity** from Combustible Elements.—Bauer, **1559.**

Discussion on "**Electrochemical** Condensers."—André, **2740.**

Industrial Utilisation of **Electrochemical** Condenser.—André, **3181.**

Distribution of Charge and Potential in **Electrolyte** bounded by Two Plane Infinite Parallel Plates.—Corkill & Rosenhead, **291.**

Frostproof **Electrolytic Condenser.**—Gutin, **329.**

Measurement of H.F. Loss Angle of **Electrolytic Condensers.**—von Kilinski, **814.**

Residual Active Layer in **Electrolytic Condensers,** *and* Effect of Al_2O_3 Film upon Formation of Active Layer in **Electrolytic Condensers.**—Miyata, **3578.**

Achievement in Condenser Manufacture [**Electrolytic** 1 Farad].—Siemens & Halske, **328.**

New Uses of Capacitors in Control Circuits [taking Advantage of Improvements in **Electrolytic Condensers**].—Winter, **815.**

Electrolytic Method of studying Electrostatic Fields.—Lukoshkov, **1986.**

New Design of **Electrolytic Trough** for Determination of Potential Fields.—Himpan, **3144.**

Velocity Changes of **Electrons** in Deflecting Condenser at Ultra-High Frequencies, *and* Model Tests on **Electron** Motion in Alternating Fields.—Döring : Brüche & Döring, **2385.**

Emission of **Electrons** from "Cold" Metallic Targets under High-Energy Positive Ion Bombardment.—Fisk, **771.**

Numerical Calculations of Reflection of **Electrons** by Metals.—MacColl, **773.**

Velocity-Modulated **Electron Beams** in Crossed Deflecting Fields, *and* Papers on Electron Lenses at Ultra-High Frequencies.—Kockel & Mayer : Recknagel : Nesslinger, **2384.**

Magnetostatic Focusing of **Electron Beams.**—Mynall, **4394.**

Limiting Current Densities in **Electron Beams.**—Pierce, **1563.**

Rectilinear **Electron** Flow in **Beams.**—Pierce, **3548** & **4393.**

Formation and Maintenance of **Electron and Ion Beams.**—Smith & Hartman, **2409.**

Electron Beams : see also Ion.

Electron Diffraction Camera for Study of Emissive Surfaces.—Ruedy, **3551.**

Electron Emission into Dielectric Liquids.—LePage & DuBridge, **4071.**

Electron Microscope.—E. M. Fellowship, **4005 ;** von Ardenne, **769** (Magnitude of Aperture Error), **2709** (Universal E.M. for Bright & Dark Fields, Stereo-Images), **4401** (Metallic Oxide Smokes); von A. & Reibedanz, **1990** (Boring Fine Holes with Needle); Boersch, von Ardenne, **1571** & **2710** (E. Shadow M.); Dorgelo, **3547** (Types of E.M.); E.M.I., **4004** (using Electron Mirror); Hoffmann, **278** (Image Formation by Electrons); Krönig, **3547** (Theoretical Foundations of Electron Optics); Mahl, **1570** (Electrostatic E.M. of High Resolving Power); Martin, **4403** (Ultra-Violet & Electron Microscopy); Marton, **3545, 3546,** & **4002** (New RCA Magnetic E.M.); Morton & Ramberg, **768** (Point-Projector E.M.); Rigamonti, **1568** (Magnetic : High Beam Concentration); Ruska, **3547** (Supermicroscopy); Scherzer, **1171** (Theoretically Attainable Resolving Power); Sugata, **1572** (Limit of Magnification by Magnetic Lens); Vance, **3545** (Stable Power Supplies for E.M.); Zworykin, **4003** (E.M. for Research Laboratory). See also Book-Review, Electron-Optics, Ionic-Probe, Microscope, Super-Microscope, and under "Miscellaneous."

Influence of Magnetic Field upon **Electron Motion** in Axially Symmetrical Fields.—Spiwak & Zrebny, **1981.**

Mechanical Analogy to **Electron Motion** in Gases.—Yarnold, **1982.**

Application of Electric and Magnetic Fields in **Electron-Optics.**—Brüche, **2711.**

Electron Optics [including Electron Microscopes, Phase Focusing, and Chronological Survey].—Myers, **274.**

Questions of **Electron-Optics** (Electron Lens with Intermediate Grid : Electron Mirror : Immersion Lens).—Picht, **767.**

Electron Optics of Cylindrical Electric and Magnetic Fields.—Rose, **1575.**

Electron-Optical Image Errors of Third Order.—Voit, **1168.**

Electron-Optics : see also Ballistic-Models, Book-Review, Cathode-Ray, Charged-Particle, Coolidge-Tube, Electron-Beam, Electron-Microscope, Electron-Motion, Image-Errors, Immersion, Lens, Magnetic-Field, Mean-Free-Path, Refraction, Space-Charge, and below.

Electron Telescope [for Infra-Red Light].—Malatesta, **1573.**

Electrostatic Field produced by Point Charge in Axis of Cylinder.—Weber, **350.**

Energy : see Ballistic-Models, Discharges, Hollow-Cathode, Magnetisation.

Recent American Advances in Apparatus and Technique of **Experimental Physics.**—Overbeck, **1240.**

High-Temperature Magnetisation of **Ferrites.**—Takei, **3605.**

Magnetic Method of Investigating Internal Elastic Stresses in **Ferromagnetic** Metals.—Akulov & Kirenskij, **2049.**

Electrical Resistance of **Ferromagnetic** Amalgams.—Bates & Fletcher, **2044.**

Modification of Heisenberg's Theory of **Ferromagnetism,** *and* **Ferromagnetic** Anisotropy and Itinerant Electron Model.—Bitter : Brooks, **3608.**

Physical Basis of **Ferromagnetism.**—Bozorth, **2050.**

Ferromagnetic Domains and Magnetisation Curve.—Brown, **3609.**

Influence of Mechanical Treatment, Pressure, and Temperature on Characteristics of **Ferromagnetic** Materials.—Chiodi & Zerbini, **2043.**

Investigations of **Ferromagnetic** Impurities, *and* Surface Effects in Testing for **Ferromagnetic** Impurities.—Constant & Formwalt, **1221.**

Magnetic Moment in **Ferromagnetic** Alloys.—Forrer, **2047.**

Ferromagnetic Anisotropy, Magnetisation at Saturation, and Superstructure in Ni_3Fe and Nearby Compositions.—Grabbe, **3610.**

Ferromagnetic Relaxation Constant.—Hoag, **1641.**

Penetration of Medium-Frequency Electromagnetic Waves in **Ferromagnetic** Materials.—van Lancker : Ribaud, **1635.**

Papers on **Ferromagnetic** Anisotropy.—Tarasov, **1639.**

Ferromagnetism in Austenite.—Tarasov & Parker, **2045.**

Theory of Technical Magnetisation Curve in **Ferromagnetic** Single Crystals, *and* Energy of Magnetic Anisotropy and Critical Field of **Ferromagnetic** cooled in Magnetic Field.—Vonsovsky, **2048** & **3196.**

Ferromagnetic : see also Alloys, Book-Review, Crystals, Ferrites, Heat-Treatment, Hysteresis, Impurities, Iron, Magnetic, Magnetite.

Fields : see Electrolytic, Lenses.

Fluid **Filling-Media** for Electrical Apparatus.—Meyer, **1207** & **3584.**

Tarnish Studies : Electrolytic Reduction Method for Analysis of **Films** on Metal Surfaces.—Campbell & Thomas, **839.**

Subsidiary Apparatus and Materials—

Protection of Thin Metal **Films** against Oxidation.—Ehrenberg, **1578.**
Conductivity and Mobility of Thin Lead **Films.**—Foster, **1624.**
Oxidation of Metals and Formation of Protective **Films.**—Mott, **3576.**
Theory of Structure and Formation of Certain Type of Immobile Adsorbed **Film,** with Application to Adsorption of Oxygen on Tungsten.—Roberts, **1629.**
Reflection and Transmission Factors of Thin Metal **Films.**—Rouard, **1232.**
Optical Properties of Evaporated Silver **Films.**—Strong & Dibble, **2400.**
Irreversible Changes of Electrical Resistance and Power of Light Reflection of **Films.**—Suhrmann & Berndt, **2016.**
Molecular **Films** as Dielectrics of High Resistance to Breakdown, *and* Electrical Resistance of Single Crystals of Long-Chain Fatty Acids.—Thiessen, Beischer, & von Gillhaussen, **3176.**
Preparation of Thin **Films** of Uranium and Thorium by Cathode Sputtering.—Van Voorhis, **2017.**
Deposition of Thin Metallic **Films** by Cathodic Sputtering.—Voss & Immelman, **3160.**
Optical Properties of Semi-Transparent Sputtered **Films** determined by Interference of Light.—Wathanson & Bartberger, **289.**
Films : see also Aluminium, Deposition, Foils, Insulating-Films, Molybdenum, Secondary-Emission, Thin, Wires.
Improved Materials for **Fluorescent** Screens, **4016.**
Spectra of **Fluorescence** and Absorption of Complex Molecules.—Blochinzev, **764.**
Beryllium Fluoride Glasses as Binders for **Fluorescent** Screens.—E.M.I., **4405.**
Preparation of **Fluorescent** Calcite.—Fonda, **3558.**
Fluorescence of Sodium Formate in Soda Solution.—Grumbach & Millet, **1583.**
Fluorescence and Phosphorescence of Photographic Silver-Halide/Gelatine Films at Low Temperatures.—Meidinger, **288.**
Polarised **Fluorescence** of Organic Compounds.—Mitra, **2395.**
Influence of Foreign Substances on Absorption of Dyestuffs [with Reference to Quenching of **Fluorescence**].—Mitra, **2717.**
Deposition of **Fluorescent** Material on Thin Layer of Gold increases Image Brightness.—R.C.A., **4017.**
Apparent Splitting of Light from **Fluorescent** Lamps into Component Parts by Moving Objects.—Scull, **3157.**
Mechanism for **Fluorescence** of Alkaline-Earth Oxides.—Uehara & Takahasi, **4013.**
Fluorescent : see also Luminescence, Microscopy, Phosphors, Photographic, Screen, Willemite, X-Ray.
Preparation of Metallic **Foils.**—Fenner, **775.**
Frequency-Changing with Mercury-Arc Mutators.—Feinberg, **2013.**
Quantitative Relations governing Working of Ferromagnetic **Frequency Demultiplier.**—Dehors & Rouelle, **1636.**
Measurements in Philips Rare **Gas** Plant.—Holleman, **2407.**
Electric Strength of **Gases,** measured by Corona Discharge.—Thornton, **2418.**
Gas-Filled Tetrode.—Windred, **4417.**
Philips Vacuum **Gange.**—Edwards & Company, **3162.**
Closing Compression Capillary of McLeod **Gauge.**—Ferguson, **3163.**
New-Style Ionisation **Gauge.**—Morse & Bowie, **2405** & **4410.**
Horizontal Band **Generator** after van de Graaff.—Baumhauer & Kunze, **786.**
New D.C. **Generator** for 3 Million Volts [Condensers], *and* Canal-Ray Tube for 3 Million Volts.—Imhof : Wäffler, **787.**
Electrostatic **Generator.**—Joffe & Hochberg, **4459.**
Design and Preliminary Performance Tests of Westinghouse Electrostatic **Generator.**—Wells, **4072.**
Generators : see also Electricity, High-Voltage, Rectangular, Square-Wave.
Mounting of **Getter** in Cathode-Ray Tubes, **4011.**
Gettering Powers of Various Metals for Hydrogen, Oxygen, Nitrogen, Carbon Dioxide, and Air.—Ehrke & Slack, **1998.**
Glass Fibre as Wire Covering, **3582.**
Electrical Breakdown Strength of **Glasses** versus Crystals, as Function of Temperature.—von Hippel & Maurer, **3583.**
Development of Pre-Stressed **Glass** Insulator, *and* Performance of **Glass** Insulators.—Hogg : E.R.A., **2735.**
Flexible **Glass** Insulation.—Lee, **823** & **2027.**
Glass as Electrical Insulator.—Phillips, **2427.**
Dielectric Losses due to Relaxation in **Glass** at High Frequencies.—Skavani, **1200.**
Effects of Neutralisation and Crystallisation in reducing High-Frequency Losses in **Glass.**—Skanavi & Martushov, **1604.**
Glass Fibre Electrical Insulation [Criticisms].—Wyman : Quarendon, **3581.**
Glass : see also Book-Review.
Super-Temperatures in **Glow** Discharge.—Fischer, **2006.**
Recombination in Negative **Glow** Discharge.—Fischer, **3173.**
Some Consequences of Our Simple Relation about **Glow** Discharge.—Kasiwagi, **3566.**
Electric **Glow** between Carbon Electrodes.—Newman, **795.**
Vacuum **Glow** Discharge as Test Electrode, **2421** & **4458.**
Some Experiments on Theory of **Glow** Discharge.—Weizel & Olmesdahl, **2005.**
Transition from **Glow to Arc** Discharge.—Wheatcroft & Barker, **2004.**
New Form of Sauter X-Ray **Goniometer.**—Thomas, **3207.**
Large Anisotropy of Electrical Conductivity of **Graphite.**—Krishnann & Ganguli, **326.**
Measurement of **Gyromagnetic** Effect in Alloys Manganese/Antimony and Iron/Selenium.—Galavics, **1217.**
Mechanical **Harmonic Synthesiser-Analyser.**—Brown, **1239.**
Resistance to Chemical Action of **" Hartpapieren."**—Paul, **2435.**
Electronic Relay for **Heat Control.**—Hall & Heidt, **4045.**
Heat Treatment of Ferromagnetic Polycrystals in Magnetic Field.—Shur, **1215.**
Change of Length and Young's Modulus with Magnetisation and **Heat Treatment.**—Williams, **4049.**
Heat Treatment : see Ferrites, Ferromagnetic, Impurities, Magnets, Viscosity.
General Solution of **Helmholtz** Equation, taking into Account Effect of Iron.—Kovalenkov, **4429.**
Radio-Frequency **High-Voltage** Phenomena.—Alford & Pickles, **1197** & **2021.**
Electrostatic Generator and Ion Source for **High Voltage** Research.—Getting, Fisk, & Vogt, **1195.**
Measurements on Resonance Apparatus for Generation of Very **High** Alternating **Voltages.**—Hauser : Hasselbeck & Dänzer, **3168.**
Papers on **High-Voltage** Electrostatic Generators, including Experimental Models, for Atomic Structure Investigations.—Joffe, Hochberg, **3167.**
Revival of Interest in Brasch & Lange **High-Voltage** Impulse Tube.—Sheppard, **3169.**
High Voltages : see also Cyclotron, Generator, Screened, Stabiliser,
Investigations on **Hollow Cathodes.**—Lompe, Seeliger, & Wolter. **312.**
Exchange of Energy between Translation and Rotation by Collisions [from Spectra of **Hollow-Cathode Discharge**].—Haber, **313.**
Theory of Dielectric **Hysteresis** [in Condenser Discharge].—Castro, **346.**
Magnetic Texture and Magneto-Elastic **Hysteresis.**—Dekhtjar, **845.**
New **Hysteresis** Model.—Goucher, **4428.**
Hysteresis in Ferromagnetics.—Kondorsky, **3197** & **3607.**
New Method for Mathematical Representation of " After-Effect " Phenomena, and in particular of **Hysteresis.**—Kovalenkov & Machinski, **4427.**
Anisotrophy of **Hysteresis** in Ferromagnetic Single Crystals.—Shur, **3195.**
Rotational and Alternating **Hysteresis** Losses in Electrical Sheet Steel.—Tarasov, **1219.**
Hysteresis : see also Paramagnetic, Viscosity.
Igelite : see Wires.
New **Ignitron** Firing Circuit.—Klemperer, **1592.**
Theory of **Image Errors** of Fifth Order in Rotationally Symmetrical [Optical] Systems.—Herzberger, **281.**
Relationship between Certain Optical Parameters and Electrical and Geometrical Parameters of Electrical **Immersion Objective.**—Savchenko, **4001.**
Impulse Generator for Medium Voltages, *and* New Method for Investigation of **Impulse** Corona.—Balygin : Fertik, **2415.**
Some Recent Developments in **Impulse-**Voltage Testing.—Foust & Rohats, **3587.**
Transformation of **Impulse** Voltages.—Heuse, **282.**
Investigation of High-Vacuum Discharges at **Impulse** Voltages up to 2.5 Million Volts.—Zingermann & Korsunski : Zingermann, **1586** & **2414.**
Impulses : see also Interval, Polygraph, Pulses, Rectangular.
Effect of Heat Treatment on Ferromagnetic **Impurities.**—Constant, **3606.**
Magnetic Properties of Ferromagnetic **Impurities** in Non-Ferrous Alloys.—Schröder, **2046.**
Distribution of **Induction Currents** in Metal Plates and Cylinders.—Shilov, **1233.**
Inductor with Air-Gapped Magnetic Circuit.—Glazier : G. W. O. H. : Marinesco, **354, 2456,** & **3603.**
Inductors : see also Iron-Cored.
Infra-Red : see Phosphors, and under " Miscellaneous."
Ink-Writers of Highest Sensitivity with Self-Compensated Amplifiers.—Derigs & Voss, **2761.**
Current Progress in Electrical-**Insulation** Research reflected at National Research Council Conference, **2725.**
Triple Alliance in Electrical **Insulation.**—Berberich, **2724.**
Insulating Materials : Principal Developments of Past Year [Distrene, Polythene, etc.].—Dunton, **1599.**
Use of Statistical Methods of Analysis in **Insulation** Research.—Egerton & McLean, **2727.**
Developments in **Insulating** Materials [with References].—Gillies, **1203.**
Physical Problems of Commercial **Insulating** Materials.—Goldschmidt, **830.**
How do **Insulators** Insulate ? [Massachusetts Institute of Technology's Researches].—von Hippel, **829.**
Dielectrometer, and Other Papers on Measurement of Properties of **Insulators.**—Holloway : Kanno : AIEE : Chowdri, **3586.**

Subsidiary Apparatus and Materials—

Spectral Measurements at Wavelengths 0.2–0.5 mm on **Insulating** Materials and Oxides.—Maar, **334.**

[Ultra-] H.F. **Insulation** Materials: Results of Laboratory Tests of Synthetic Plastics.—Mabb, **333.**

The Chemist and Electrical **Insulation.**—Mersey, **2424.**

Equipment for Testing Electric **Insulating** Materials for Dielectric Strength.—Morgan, **345.**

Thickness of **Insulating Films.**—Shimizu & Inai, **826.**

Testing **Insulators:** Substitution of Vacuum Glow-Discharge for Water as Interior Electrode.—Subak, **4458.** See also Glow-Discharge.

Physics and Electrical **Insulation.**—Thomas, **2423.**

Proposed Rules for Electrical Tests on **Insulating** Materials.—VDE, **832.**

Insulation [Address to I.E.E. Section].—Warren, **3585.**

Insulating, Insulators: see also Alsifilm, Amber, Bitumen, Book-Review, Breakdown, Bushings, Cellulose, Ceramics, Concretes, Dielectrics, Discharge, Filling-Media, Films, Glass, Glow, Hartpapier, High-Voltage, Japanese, Kerosene, Marble, Materials, Metals-&-Plastics, Micanite, Moisture, Moulding, Mycalex, Oils, Oppanol, Paper, Paraffin, Phenoplastics, Plastic, Porcelain, Quartz, Rectifiers (**807**), Resins, Resistors, Rubber, Rutil, Secondary-Emission, Steatite, Styroflex, Sulphur, Synthetic, Wire.

Interval Meter and Application to Geiger Counter Statistics.—Driscoll & others, **4439.**

Interval Selector: Device for Studying Time Distribution of Pulses.—Roberts, **2763.**

Self-Regulated **Inverter** in Push-Pull Connection.—Brückner, **4026.**

Progress Report on High-Voltage Production of Positive **Ion** and Electron Beams.—Van Atta, Van de Graaff, **2408.**

High-Efficiency **Ion** Source.—Finkelstein & Smith, **2411** & **2412.**

Ion Source of Low-Voltage Capillary-Arc Type.—Allison, **1999.**

Nature of **Ions** emitted by Heated Filaments and Salts.—Toubes & Rollefson, **4416.**

Focusing of **Ion Beams** by Electrostatic Lenses.—Petrie, **2410.**

Production of Large **Ionic** Currents by Gasomagnetron.—Vigdorchik, **783.**

Ionic Probe of Great Sharpness.—von Ardenne, **1567.**

Townsend **Ionisation** Coefficients for Ni and Al Cathodes in Atmosphere of Hydrogen.—Hale, **1597.**

Ions, Ionisation: see also Book-Review, Capillaries, Cyclotron, Electron.

High-Frequency Resistance and Permeability of **Iron** in Magnetic Field.—Hoag & Cox, **4048.**

Magnetisation and Eddy Current Loss in Thin **Iron** Sheets.—Panczakiewicz, **1218.**

Resistance Measurements on **Iron** Wires in Ultra-High-Frequency Range.—Strutt & Knol, **1634.**

Iron-Cored Coils of High Efficiency.—Partridge, **3602.**

Unstable Non-Linear Circuit including **Iron-Cored** Reactance.—Summers, **3601.**

Circuits coupled by **Iron-Cored** Inductance depending on Current.—Taeger, **356.**

Iron, Iron-Cored: see also Alloys, Chokes, Ferromagnetic, Helmholtz, Nickel, Permeability, Viscosity.

Research on **Japanese Lacquer** with Phenolic Resin and Amber.—Shimizu & Inai, **827** & **1606.**

New Electrothermic **Joining** Method for Fixing Metal Parts to Ceramic Bodies.—Osenberg, **1612.**

Electrical Properties of **Kerosene.**—Hochberg & Glikina, **1208.**

Transformer **"Kipp"** Devices.—Mulert & Bäbring, **284.**

Spectral Distribution of Radiation from **Lamps** of Various Types.—Barnes, **1183.**

Operating Temperatures of Vapour **Lamps.**—Marden, **4073.**

Lamps: see also Discharge, Mercury, Switch.

Electrostatic High-Voltage **Lens** of Short Focal Length.—von Ardenne, **280.**

Image Error Investigations on Magnetic **Lens.**—Becker & Wallraff, **279, 2712,** & **2713.**

Measurements of Image Errors in **Lens** enclosed in Iron with Variable Air Slit.—Becker & Wallraff, **3155.**

Resolving Power of Magnetic Electron **Lens** used as Beta-Ray Spectrometer.—Cosslett, **3550.**

Gaussian Dioptrics of Electrical-Magnetic Cylinder **Lens.**—Gratsiatos, **1983.**

Electron-Optical Cylinder-**Lens** Effect of Leakage Fields of Condenser.—Herzog, **1576.**

Non-Cartesian Treatment of Mirror, Refracting Surface, and **Lens.**—Irons, **3554.**

Magnetic **Lenses** and Fields.—Telefunken, **1985.**

Levers of Constant Ratio [for Fine Adjustments, etc.].—Clay, **2060.**

Circuit Arrangement for High-Pressure Mercury-Vapour Lamps for Generation of **Light Flashes.**—Ewest, **798.**

Value of **Light Metals** in Construction of Electrical Machines and Apparatus.—Pausert, **4075.**

Influence of Quasi-Crystalline Structure on Molecular Rotation and Relaxation in Dipole **Liquids.**—Fischer & Klages, **1608.**

Researches on **Liquid** Dielectrics, according to Congress of American Chemical Society.—Génin, **351.**

Frictional Dispersion of Dielectric Constants of Organic **Liquids** at Very High Frequencies.—Odenwald, **353.**

Absorption in the Range of Short Electric Waves, measured on Dipole **Liquids** and Electrolytes.—Schmale, **352.**

Preparation of **Luminescent** Materials with Low-Melting Fluxes, **2392.**

Decay of **Luminescence** in Certain Classes of Luminescent Substances.—Aliavdin, Fedorov, & Levshin, **3556.**

Luminescence of Synthetic Halide Crystals [Sodium Chloride/Manganese Chloride: Optimum Percentages of Manganese].—Cohn, **763.**

Spectrophotometric Researches on Electro-Photo**luminescence.**—Destriau & Loudette, **1997.**

Photometric Properties of Some **Luminescent** Materials.—Harper & others, **4408.**

Band Spectra of Cathodo-**Luminescence,** *and* Charging and Decrease of Charging of **Luminescent** Materials and Semiconductors irradiated by Electrons.—Henderson: Krautz, **1175.**

Luminescence of Pure Radium and Barium Compounds.—Kabakjian, **2716.**

Luminescence and Absorption of Zinc Sulphide, Cadmium Sulphide, and Solid Solutions.—Kröger, **1174.**

Possibility of interpreting Phenomena of Polarised **Luminescence** using Linear Oscillator Model.—Lewschin, **1176.**

Experiments on Thermo**luminescence** of Some Common and Unusual Minerals.—Northup & Lee, **3158.**

Luminescence of Solids.—Randall & Wilkins, **1996.**

Photo**luminescence** of Scheelites.—Servigne, **2396.**

Luminescent Materials: Theory of ZnS Crystal Phosphors.—Uehara, **3156.**

Magnet.—Biffi, **2447** (Apparatus for Testing of Permanent Ms.); Bitter, **1213** (Design of Powerful Electro-M.); General Electric, **2034** (Assembly multiplies M. Strength); Kapitza, **1637** (World's Most Powerful M.); Kayser, **4426** (Permanent Ms: Cooling in Magnetic Field); Maccall, **4056** (Permanent Ms.); Marsh, **3201** (Testing of Permanent Ms.); van Urk, **2035** (Modern Steels for Permanent Ms.); Venco, **2036** (Industrial Applications).

Magnet-Current Stabiliser.—Lawson & Tyler, **294.**

Magnetic.—Ashworth, **1638** (Testing M. Materials); Bates, Baker, Meakin, **3613** (M. Properties of Non-Homogeneous Systems); Bitter & Kaufmann, **1642** (M. Studies of Solid Solutions); Bozorth & Williams: Tarasov, **4053** (Anomalous M. Torque Curves); Brown, **4054** (Approach to M. Saturation); Döring, **1220** (Reversible Phenomena in M. Materials with Small Internal Tensions); Meeks & Jamison, **2052** (Susceptibilities in Weak Fields); Opechowski, **360** (Exchange Interaction in M. Crystals); Reekie, **1227** (Susceptibility of Cupric Salts); Sandford & Bennett, **361** (Testing at Forces up to 5000 Oersteds).

Variation of Self-Inductance of H.F. Coils by D.C. **Magnetic Bias.**—Maus, **1214.**

Production of Annular **Magnetic Field** of Great Uniformity.—Ference, Shaw, & Stephenson, **2031.**

Coils for Production of Uniform **Magnetic Field.**—Lyddane & Ruark, **283.**

Improving Uniformity of Central **Magnetic Field** in Thick Solenoid.—McKeehan, **1212.**

Influence of **Magnetic Field** on Mercury-Discharge Radiation.—Rokhlin, **1182.**

Distribution of **Magnetic Flux** in Electromagnetic Devices.—Livshits, **4431.**

Magnetic Flux: Convenient Direct-Reading Meter [using Bismuth Spirals].—Smith, **362.**

Energy Changes accompanying **Magnetisation.**—Bates & Weston, **2040.**

Retardation of **Magnetisation** by Microscopic Eddy Currents.—Becker, **842.**

Mechanism of **Magnetisation.**—Wall, **3615.**

Magnetism and Structure of Matter.—Lonsdale, **2039.**

Effect of Current through Iron Bar on Residual **Magnetism.**—Perkins & Doolittle, **2038.**

Magnetic, Magnetism: see also Alloys, Aluminium, Amplifier, B-H-Curve, Choke, Cobalt, Crystals, Demagnetising, Discharges, Electron-Motion, Ferromagnetic, Frequency-Demultiplier, Gyromagnetic, Hysteresis, Iron, Manganous, Nickel, Paramagnetic, Permalloy, Permeability, Plasma, Screening, Textures, Vicalloy, and below.

Phase Orientation due to Reduction of **Magnetite** by Hydrogen.—Buinov & others, **2454.**

Course of Orientated Displacement of **Magnetite** by Iron.—Frank-Kamenecki, **1216.**

Optical and Magnetic Properties of **Magnetite** Suspensions: Surface Magnetisation in Ferromagnetic Crystals.—McKeehan: Heaps, **2455** & **3604.**

Electronic Conduction of **Magnetite** and Transition Point at Low Temperatures.—Verwey, **359.**

Magneto-Magnetic and Magneto-Torsional Effects in Alternating Currents.—Valle, **2453.**

Antiferromagnetism in Some **Manganous** Compounds, *and* Electrical Conductivity as Function of Temperature of Some **Manganous** Compounds.—Squire, **847.**

Subsidiary Apparatus and Materials—

Differential Liquid **Manometer** of High Sensitivity, founded on Theory of Submarine Waves.—Sederholm & Benedicks, **4022.**
Simple **Manometer** for Measurement of Total Pressure.—Weiss & Westmeyer, **2406.**
New Quartz-Fibre **Manometer** of High Accuracy and Sensitivity.—Wetterer, **780.**
Dielectric Constant, Power Factor, and Resistivity of **Marble.**—Scott, **2736.**
Special Machines and Tests to Facilitate Mechanical Examination of **Materials.**—Beak, **3592.**
Materials for Vacuum Tube Manufacture.—Monack: R.C.A., **4020.**
Modern **Materials** in Telecommunications.—Radley, **3593.**
Mean Free Path in Gases contained in Vessel.—Saito, **770.**
Improved Form of Vacuum Arc **Mercury** Still for Laboratories.—Sivaramakrishnan, **782.**
Luminous Intensity of High-Pressure **Mercury-**Vapour Discharge.—Kern, **797.**
Electron Concentration and Temperature in **Mercury** High Pressure Column and Determination by Broadening of Spectral Lines due to Electron Collisions.—Schulz, **1188.**
Development of Water-Cooled Quartz **Mercury** Lamps.—Noel, **3150.**
Capillary **Mercury** Lamp as Oscillograph Light Source.—Skilling. **3149.**
Mercury-Vapour **Rectifier** Tube [specially for Cyclotron, to withstand Surges & Overload Currents].—Allen & Nester, **1591.**
Surface-Controlled **Mercury-**Pool **Rectifier.**—Libby, **2012.**
Voltage Control of **Mercury-**Arc **Rectifiers.**—McDonald, **1193.**
Sectional H.T. **Mercury-**Vapour **Rectifiers.**—Rakov & Fetisov, **322.**
" Sucking Effect " in **Mercury Rectifiers.**—Tonks: Poletaev, **1192.**
Back-Firing in **Mercury-**Arc **Rectifiers.**—White, **4418.**
Periodic Extinction and Control of **Mercury-Vapour Arc** by Grids in Plasma, *and* Influence of Control Grid in Plasma on **Mercury-Vapour Arc.**—Wehner: Fetz, **2749.**
Determination by Nomograms of Weight of Material used when Stamping **Metal Details** from Sheets.—Bazylev, **850.**
Moulding of **Metal Details** under Pressure.—Spiridonov, **849.**
Minute " Precision Shapes " in **Metals and Plastics, 848.**
Production of **Micanite** [Survey in U.S.A.].—Tyler, **337.**
Micro-: see Oscillograph, Ultra-High.
Depth of Focus of **Microscope** Objectives.—Beadle, **3553.**
Formation of Images of Transparent Objects in **Microscope.**—Rogestwensky, **4404.**
New Method of **Microscopy** in Ultra-Violet Rays.—Brumberg, **3552.**
Rhodium **Mirrors** for Scientific Purposes.—Auwärter, **1627.**
Dielectric Constant of **Moist Air.**—Koga, **3579.**
Sensitive Method for Determination of **Moisture,** applied to Electrical Insulating Materials.—Vincent & Simons, **3591.**
Heating of Thin **Molybdenum** Films in High-Frequency Electric Field.—Wright, **3575.**
Single-Phase Magnet **Motor** running at Several Synchronous Speeds.—Buchhold, **2064.**
Speed-Governed Midget Electric **Motor** [for Radio-Meteorographs, etc.].—Jacobsen, **367.**
Tables of German **Moulding Materials,** with Manufacturers' Names, etc., **2734.**
Moistureproof **Mycalex.**—Bogoroditski & Fridberg, **336.**
Effect of Gas Pressure on Rectifying Action of **Needle-Point** Discharge.—Kumagai & others, **1194.**
Material having **Negative** Resistance/Current Characteristic.—Metropolitan-Vickers, **3184.**
Galvano- and Thermomagnetic Phenomena in Iron and **Nickel.**—Butler & Pugh, **4050.**
Outer, Initial Permeability of **Nickel** from 10 to 70 Megacycles.—Hoag & Glathart, **2449.**
Approach to Magnetic Saturation of **Nickel** under Torsional Strain.—Kaufmann, **3612.**
Electron-Band Treatment of Susceptibilities of **Nickel** and Nickel Alloys.—Keyes, **4051.**
Magnetic Susceptibility of **Nickel** Chloride.—Nettleton & Sugden, **1223.**
Curie Constant and Curie Temperature of **Nickel** Alloys.—Niessen, **1222.**
Passage of Magnetisation into Saturated State for **Nickel:** Temperature Variation of Crystal Energy.—Polley, **1640.**
Method of Purification of Lubricating **Oils** [based on Effect of Electroconvective Eddies].—Avsec, **836.**
Oxidation of Mineral and Soya-Bean **Oils.**—Kumagai & Yoh, **838.**
Oxidation of **Oils** due to Light Rays and Electric Discharge.—Kumagai & Yoh, **1209.**
Properties of Distilled Transformer **Oil** at High Vacuum and Temperature.—Shimizu, **837.**
Electrophysical Properties of Transformer **Oil** at Low Temperatures.—Vorobjev & Prikhodko, **2438.**
Oppanol B, a New Hydrocarbon Polymer.—Schwarz, **1603.**
Use of Calculating Machines in **Optical Ray Tracing,** *and* Note on **Optical** Instruments of Symmetrical Construction.—Comrie: Smith, **3555.**
Order-Disorder Phenomena in Alloys.—Goodwin, **2054.**
Order-Disorder Transformation in Alloy Ni_3Mn.—Thompson, **3611.**
Electron Micro-**Oscillograph.**—von Ardenne, **1976.**
Piezo-Quartz **Oscillograph.**—Kazanski, **1160.**
Multiple **Oscillograph** of High Recording Efficiency on Pre-Anode Principle.—Thielen, **2704.**
Cathode-Glow-Discharge **Oscillographs.**—Parfent'ev, **2391.**
Unique **Oscillographic** Demonstrations.—Hoecker & Asher, **3151.**
Ultra-High-Frequency **Oscillography.**—Hollmann, **1977** & **3536.**
Cossor Double-Beam **Oscilloscope:** Comprehensive Instrument, **2390.**
Wide-Range **Oscilloscope.**—General Electric, **3542.**
Drying Process in **Paper,** as determined by Electrical Methods.—Garton, **3178.**
Papers on Polar Molecules in Solid **Paraffin** Wax.—Pelmore & Simons, **347** & **2731.**
Properties of **Paramagnetic** Salts at Low Temperature. Sauer & Temperley, **846.**
Paramagnetic Hysteresis, *and* Remark on Theory of **Paramagnetic** Relaxation.—Temperley: Ornstein, **2053.**
Paramagnetic Dispersion in Iron Ammonium Alum.—Teunissen & Gorter, **1225.**
Theory of **Paramagnetic Relaxation.**—Dänzer, **1226.**
Paramagnetic Susceptibility of Copper/Nickel and Zinc/Nickel Alloys.—Wheeler, **1224.**
Compressed Powdered Molybdenum **Permalloy** for High-Quality Inductance Coils.—Legg & Given, **4424.**
Magnetic Test for Superstructure in **Permalloy.**—Pan, **843.**
Permalloy Problem.—Schlechtweg, **2759.**
Permalloy: see also Crystals, Heat-Treatment, Permeability.
Effective **Permeability** of Substance composed of Spherical Metallic Grains without Electrical Contact.—Divilkovsky, **2033.**
Measurements of High-Frequency **Permeability.**—Jackson, **4425.**
Permeability of Iron and Nickel for Hertzian Oscillations: Extension of Previous Paper.—Lindman, **2448.**
New Method of Measuring **Permeability** of Iron and Permalloy in Very Weak Magnetic Fields.—Loshakov, **2450.**
New Measurements of Magnetic **Permeability** of Iron in High-Frequency Fields.—Mash, **358.**
Permeability at Very High Frequencies.—Möhring, G. W. O. H., Hughes, **357.**
New Investigations on **Phenoplastics.**—Stäger, Sänger, & Siegfried, **1202.**
Decay of Alkali-Haloid **Phosphors** activated by Thallium.—Antonov-Romanovsky & Kochergin, **1965.**
Infra-Red Radiations, with Special Reference to Quenching Effects upon Zinc-Sulphide **Phosphors.**—Blake, **1994.**
Absorption Spectrum of Single-Crystal ZnS **Phosphors.**—Brasefield, **1993** & **2715.**
Measurement of Total Light for Compound **Phosphors** with Mixed Luminescent Materials.—Brauer, **762.**
After-Glow of **Phosphors** and Rôle in Light-Ray Scanner with Cathode-Ray Tube.—Brückersteinkuhl, **1582.**
Theory on Excitation of **Phosphorescence** by Cathode Rays.—Fano, **2394.**
Dielectric Losses of Irradiated Zinc-Sulphide **Phosphors.**—Gisolf, **285.**
Proportionality of Luminescence of Zinc-Sulphide **Phosphors** to Irradiation at Low Intensities.—Gisolf & Kröger, **286.**
Photoelectric Properties of Disintegrated [by Alpha Rays] ZnSCu-**Phosphors.**—Goos, **2714.**
Papers on Charging-Up and Fatigue Phenomena of Metals and **Phosphors** under Electron Beam.—Hagen, **1579.**
Luminescence of Sulphide and Silicate **Phosphors.**—Johnson, **287.**
Phosphorescent **Phosphors** [particularly Strontium-Sulphide Phosphors].—Levy & West, **4015.**
Energy Transformation in Crystal **Phosphors.**—Möglich & Rompe, **4406.**
Phosphorescence of Various Solids.—Randall & Wilkins, **2393.**
Luminescent Mechanism of Crystal **Phosphors.**—Riehl & Schön, **1580.**
Magnetism of **Phosphors.**—Sibaiya & Venkataramiah, **3557.**
Phosphors: see also Fluorescence, Luminescent.
Resolving Power of **Photographic** Films for Electron Radiation.—von Ardenne, **1172.**
Action of Electrons and X Rays on **Photographic** Emulsions.—Charlesby, **4400.**
Oiled **Photographic** Emulsions [for Fluorescent Sensitisation to Light or Charged Particles].—Rogers, **4019.**
Number of Quanta required to form **Photographic** Latent Image.—Selwyn: Webb, **1173.**
Effect of Weak Magnetic Field upon **Plasma.**—Fataliev, **1181.**
Mutual Interaction of **Plasma** Electrons.—Haseltine, **1589.**
Hall Effect in **Plasma.**—Rodin & Spiwak, **2002.**
Electron Pressure in Theory of **Plasma** Oscillations.—Seeliger & Steenbeck, **317.**
Investigation of **Plasma** Oscillations in Sodium- and Mercury-Vapour Lamps.—von Stengel, **2748.**
Magnetic Effects in **Plasma** of Arc.—Tonks, **316.**
New Synthetic Material—a New **Plastic** [" Ultrapas "], **817.**
Plastic Materials: Effect of War on Plastics Industry, **1600.**
Electroplating **Plastics, 816.**
Permanence of Physical Properties of **Plastics.**—Delmonte, **2733.**
Extruded Tubing in **Plastics.**—Irvington, **4449.**

Subsidiary Apparatus and Materials—

Flow Temperature of Thermo**plastic** Moulding Materials.—Meyer, **4451.**
Plastics and Electrical Industry.—Phipps, **4063.**
Plasticisers for Cellulose Acetate and Cellulose Acetate Butyrate—Fordyce & Meyer, **4064.**
Relations between **Molecular** Structure and **Plasticising** Effect.—Kirkpatrick, **4450.**
Experimental Study of "Power of **Points.**"—Yadoff, **2011.**
Theory of Dielectric **Polarisation** in Liquids.—Zakrzewski & Piekara, **1211.**
Local Field in **Polarised** Dielectrics.—Jaffé, **2422.**
Simple Multi-Speed Pencil **Polygraph.**—Craik, **1631.**
Investigation of Synthetic Linear **Polymers** by X-Rays.—Fuller, **4454.**
Polymerisation Processes in Electric Discharges.—Schechter & Syrkina, **4067**
Polystyrene : Characteristics and Application in Short-Wave Equipment.—Riddle, **821.**
Polystyrene applied to Radio Apparatus.—Harvey & Carlson, **822.**
Dielectric Strength of **Porcelain.**—Bellaschi & Manning, **1605.**
Conductivity Measurements on **Potassium Halides.**—Brennecke **2398.**
Performance of Capacitive **Potential Dividers.**—Mauduit, **4398.**
Preparation of Metals in Compact Form by **Pressing and Sintering.**—Fast, **1228.**
Two Constant-**Pressure** Devices.—Clow & Shand, **302.**
Necessary Qualities of Condensers as affecting Choice of Dielectric, *and* Foil-Cooled **Pressure Condenser.**—Swerup : Hansson, **2436.**
Primary Batteries : see Dry-Cell, Voltaic.
Cathode-Circuit **Protection.**—Woods, **2058.**
Protective Arrangements for Measuring Instruments.—von Brockdorff, **851.**
Protective : see also Bimetallic, Relays.
Natural Oscillations of Single-Stage **Pulse** Generator.—Lehmhaus, **3170.**
Differential **Pulse-**Amplitude Selector.—Roberts, **1593.**
Recording of Current **Pulses** by Slow Galvanometers.—Rogers, **3590.**
Pulses : see also Impulses.
Geissler Tube Protection for Oil Vapour **Pumps.**—Bainbridge & Sherr, **304.**
Invention of Thermal **Pump.**—Bush & Rose, **303.**
Trends in Design of Fractionating **Pumps.**—Hickman, **4409.**
Oil-Vapour Condensation **Pumps** with High Speed of Evacuation.—Matricon, **777.**
Design of Up-to-Date High-Vacuum **Pump** Installation.—Michaelis, **778.**
Crystals of **Quartz** Glass, *and* Mosaic Blocks of Crystalline **Quartz.**—Shishakov, **1199.**
Production of Very Fine **Quartz** Fibres.—Holbourn, **1231.**
Gas Discharge Tubes in **Quench** Circuits.—Windred, **2420.**
New Materials used in Mass Production of **Radio Apparatus.**—Efrus, **344.**
New Coordinate **Recorder** [Substitute for C-R Oscillograph].—Gruhn, **765.**
Crystal **Recorder** for Electrical Potentials : Damping of Piezo-electric Systems.—Offner, **3152.**
Recording System for Investigation of Electrical Relations in Brains of Small Animals.—Woonton, **2708.**
Recording : see Einthoven, Ink-Writers, Polygraph, Pulses.
Generation of **Rectangular** Impulse Voltage.—Gosho, **3588.**
Constant-Potential **Rectification.**—Stevens & Walker, **2018** & **3189.**
Magnesium/Copper-Sulphide **Rectifier** Battery Charger.—Bartholomew : Kotterman, **324.**
Application of "Selenofer" **Rectifiers** to Electro-Plastics.—Giroz, **807.**
High-Voltage **Rectifiers** for Laboratory Purposes.—Häder, **2750.**
Rectifier Equipment with Output Voltage Independent of Load.—Harres, **801.**
Comparative Merits of Dry-Plate **Rectifiers** for Heavy Duty.—Kotterman & others, **324, 1614,** & **3571.**
Testing of Ionic **Rectifiers** with Two Different Current Sources.—Marx, **799.**
Characteristics of Thermionic **Rectifiers** at High Voltage.—Miyazaki, **3589.**
Contribution to Theory of Diode [and Dry-Plate] **Rectifier.**—Oplustil, **3570.**
Critical Inductance and Control **Rectifiers.**—Overbeck, **320.**
Theory of **Rectifier** Circuits, with Special Reference to Harmonics in Supply Circuit.—Satoh, **4027.**
Impulse Excitation of Grids of Gas-Filled **Rectifier.**—Spitsyn & Voychinski, **321.**
Behaviour of Half-Wave **Rectifiers.**—Stout, **800.**
Rectifiers : see also Copper, Crystal, Cuprous, Diffusion, Discharge-Tubes, Dry-Plate, Ignitron, Inverter, Mercury, Needle-Point, Points, Rectifying, Selenium, Semiconductor, Styctographic, Thyratrons, Vibrators.
Volume **Rectifying** Action in Cu_2O Crystals [Connection with Crystal Photoelectric Effect].—Lambert, **1615.**
Application of Abelian Finite Group Theory to Electromagnetic **Refraction.**—Whiteman, **1577.**
Concerning Thermionic **Regulation** of D.C. Generators.—Danforth, **2383.**
Regulation : see also Book-Review.
Gas-Expansion Electric **Relays, 1632.**
Relays for Electronic Circuits, **4436.**
Effect of Higher Harmonics on Operation of Induction-Current **Relay** with Short-Circuited Turn.—Bull, **4438.**
Design of Circuits using Permanent Magnets, of Polarised-**Relay** Type.—Milstein, **3202.**
Brown Boveri **Relays.**—Stöcklin & Schneider, **4437.**
Design of Detector **Relays.**—Vitenberg, **4433.**
Relays : see also Armature, Commutators, Contacts, Controlling, Gas-Filled, Heat-Control, Magnetic-Flux, Transducer, Trigger-Tube, and below.
Relay-Chatter Meter [better than Oscillograph].—Cory, **2762.**
Remote Control of Rotary Switches.—Rudd & Craig, **3188.**
Remote Control : see also Commutators, Controlling, Relays, and under "Miscellaneous." See also Calling-Device.
Dielectric Loss in Simple Alkyd **Resins.**—Pelmore & Simons, **2434** & **4065.**
Gold-Chromium **Resistance** Alloy for Standard Resistances.—Schulze, **2743** & **3206.**
Temperature-Independent Electrical **Resistances.**—Hildebrandt **2742.**
Compact Wire-Wound **Resistances.**—Vaganov, **2030.**
Resistors and Condensers in Mass Production.—Chase, **812.**
Spun-Glass Flexible **Resistors.**—Mucher, **811.**
New Colour Codes for **Resistors** and Fixed Condensers.—R.M.A., **4423.**
Wire-Wound **Resistors.**—Sprague Products, **1626.**
Resistances, Resistors : see Iron, Thermistors, Varistors, Wire.
Dielectric Measurements in Carbon-Black and Zinc-Oxide Dispersion in **Rubber.**—Kemp & Herrmann, **342.**
Action of Ozone on **Rubber** and Other Materials.—Norton, **2029.**
Rubber-like Properties of Polybutene.—Sparks, **4455.**
Synthetic **Rubbers :** Review of Compositions, Properties, and Uses.—Wood, **4456.**
Transition from Anatas into **Rutil** and Influence of Presence of Hydrochloric Acid Gas.—Hüttig & Kosterhon, **820.**
Dielectric Properties of **Rutile** Crystalline Modification of Titanium Dioxide.—Berberich & Bell, **2726.**
New Vacuum Tube **Scaling Circuits** of Arbitrary Integral or Fractional Scaling Ratio.—Lifschutz, **2764.**
New Type of Luminescent **Screen** for Cathode-Ray Tubes for Television Purposes.—de Quervain, **1581.**
Halation on Kinescope **Screens.**—Baker, **4014.**
Papers on White Luminescent **Screens** for Kinescopes.—Perkins : Leverenz, **4012.**
Disturbance Field of High-Tension Discharge in **Screened** Room.—Klay, **788.**
Magnetic **Screening** by Hollow Circular Cylinders.—Jaeger, **2032.**
Screening Action of Multi-Layer Shielding Coats in Telephone Cables.—Kaden & Sommer, **2760.**
Screening Effect of Wire Cages.—Kontorovich, **3598.**
Seals for Electrodes in Metal Vacuum Systems.—Hemmendinger, **177.**
Soldered Metal to Glass or Porcelain **Seals.**—Martin, **3561.**
Vacuum **Seals** for Metallic Ion and Electron Tubes.—Mashkov, **2718.**
Gasket for **Seals.**—Williamson : Pockman, **301.**
Sealing Platinum to Pyrex Glass.—Wichers & Saylor, **299.**
Production of **Secondary** Electrons by High Energy Electrons.—Fowler & Sheppard, **772.**
Secondary Emission from Films of Silver on Platinum.—Hastings, **2719.**
Direct Measurement of **Secondary** Electron Output from Insulators.—Heimann & Geyer, **2720.**
Emission of **Secondary** Electrons and Charging Phenomena at Insulators.—Hintenberger, **276.**
Secondary-Emission Factor of Electron-Irradiated Insulator—Salow, **1991.**
Charge and **Secondary** Electron Emission.—Scherer, **2721.**
Secondary Emission : see also Electrons, and under "Valves & Thermionics" and "Phototelegraphy & Television."
Construction and Use of **Selenium** Rectifiers, **4037.**
Selenium in Canada.—Byers & Lakin, **808.**
Crystallisation by Pulverisation [in connection with **Selenium**].—Dekeyser & Prins, **325.**
Selenium Rectifiers of Soviet Manufacture.—Eristov, **2014.**
Electrochemical Behaviour of **Selenium.**—Sella, **1613.**
Temperature Coefficients of **Selenium** Rectifiers.—Vitenberg, **3573.**
Contact Resistance of **Semiconductors.**—Davydov, **805.**
Semiconductors in Strong Electric Fields.—Joffe, **4420.**
Rectifying Effect of **Semiconductors** with Blocking Layers.—Pekar, **3193.**
Electroconductivity of **Semiconductors** at High Temperatures.—Schulman, **804.**
Semiconductors : see also Book-Review, Cuprous, Luminescent.
Sintering : see Pressing.
Converter for Low-Frequency **Sinusoidal Voltages** and Source of Sinusoidal Radiation Intensity.—Harris & Scholp, **1616.**

Subsidiary Apparatus and Materials—

Lead-Tin-Arsenic Wiping **Solder.**—Schumacher & Phipps, **3616.**
Molecular Interactions in **Solutions :** Effects on Rotation of Dipoles in Alternating Field.—Girard & Abadie, **1210.**
Space-Charge Effects in Electron Beams.—Haeff, **272.**
Influence of **Spark** Type (Length) and Electrode Material on Increase of Striking Distance.—Arnold, **1180.**
Enclosed **Spark** Gaps.—Berkey, **4440.**
Papers on **Sparking** Threshold in Air, and Breakdown Potential for Sphere Gaps.—Haseltine : Meek, **4034.**
Measurements on **Sparking** in Deuterium and Hydrogen.—Leeman, **791.**
Mechanism of **Spark** Discharge in Air at Atmospheric Pressure.—Loeb & Meek, **4443.**
Theory of **Spark** Discharge.—Meek, **2747.**
Variation of **Sparking** Potential with Initial Photoelectric Current.—Meek, **3568.**
Spark Breakdowns of Hitherto Unobserved Form.—Neubert, **2009.**
Spark Gaps with Short Time Lag.—Slepian & Berkey, **4032.**
Spark by Field Emission [Kerr-Cell Methods of measuring Periods and Impulsive Potentials].—De Stefano & Ferretti, **2010.**
Rôle of Ionisation by Positive Ions in **Spark** Breakdown.—Varney & others, **3172.**
Spark, Sparking : see also Breakdown, and below.
Radio-Frequency **Spark-Over** in Air.—Ekstrand, **792** & **4062.**
Effect of Irradiation, Humidity, and Sphere Material on **Spark-Over** Voltage of 2-Centimetre Sphere Gap.—Lewis, **789.**
Pulses of Electrical Tension and Probability of **Spark-Over.**—de Seras, **314.**
Polonium Alloy for **Spark-Plug** Electrodes.—Dillon, **2746.**
Measuring and Automatically Regulating **Speed** of Ultracentrifuge.—Björnståhl, **368.**
Square-Wave Generators.—Cossors : General Radio, **3589.**
High-Voltage **Stabiliser.**—Alfvén & Eklund, **4038.**
Stabilisation : see Constant-Current, Magnet-Current, Voltage.
Steatite.—Oyama, **4069.**
Designing Die-Pressed **Steatite** Ceramics.—Scoville, **824.**
Improved Glass **Strain Analyser, 298.**
Stroboscopic Coherers.—Penner, **855.**
Styroflex and Rôle in Construction of Cables.—Fischer & Müller, **1201.**
Condensers of Negligible Leakage [Rhombic **Sulphur** Dielectric].—Bradbury, **332.**
Results with New Electron **Super-Microscope** Equipment, *and* Stereo-Supermicroscopy with Universal Electron Microscope.—von Ardenne, **3153.**
Super-Microscope for Research Institutes.—von Borries & Ruska, **275.**
New, Simple **Super-Microscope** and Application in Bacteriology.—Brüche & Haagen, **1569.**
Development of Electron **Super-Microscope** at Toronto.—Burton, Hillier, & Prebus, **1170.**
Metallurgical Investigations with Electrostatic **Super-Microscope.**—Mahl, **1989.**
Stereoscopic Photographs with Electrostatic **Super-Microscope.**—Mahl, **3154.**
Super-Microscope : see also Electron-Microscope.
Apparatus for **Superposition** of Sinusoidal Lines.—Walther, **766.**
Susceptibility : see Magnetisation.
New Method for determining **Sweep Linearity.**—Seeley & Kimball, **1562.**
Electrical Stepping **Switch, 4046.**
Electron **Switch.**—Dorsman & de Bruin, **1161.**
Electronic **Switch** for Fluorescent Lamps [" Glow-Switch "].—Hays, **4041.**
Switching Circuit for Observation of Two Separate Processes by Cathode-Ray Oscillograph.—Koller, **2404.**
Fundamental Ideas of General Technique of **Switching.**—Piesch, **810.**
Switches, Switching : see also Commutators, Contact, Direct-Visualiser, Remote-Control.
Synchronisation of Simple Relaxation Oscillator.—Builder & Roberts, **3148.**
New Type of Installation System with **Synthetic-Resin** Tubes, **1623.**
Dielectric Characteristics of Chemically Pure **Synthetic Resin.**—Garton, **339.**
Deposition of **Synthetic Resins** by Electrophoresis.—Génin, **4066.**
Thermal and Electrical Properties of Coatings of **Synthetic Resins.**—Shimizu & Inai, **2433.**
Metallic Materials in **Telephone System.**—Schumacher & Ellis, **2055.**
Materials with Special **Temperature Coefficient** of Modulus of Elasticity.—Fahlenbrach & Meyer, **2446.**
Temperature Distribution surrounding Some Bodies heated Electrically.—Shimizu & Nishifuji, **4421.**
Temperature Rise of Electrical Apparatus as Affected by Radiation.—Penney, **3595.**
Magnetic Properties of Recrystallisation **Textures,** *and* Other Papers.—Mussmann, Schlechtweg, **3199.**
Effect of **Textures** on Magnetic and Other Properties.—Wassermann : see Book-Review.
Thermistor Voltage Regulator.—Green & Pearson, **3597** & **4042.**
New Type of **Thermo-Regulator.**—Klein, **2444.**
Highly Sensitive, Rapidly Acting **Thermostat.**—Fischer, **2445.**
Investigation of Wetting of **Thin** Layers of Metals obtained by Evaporation *in Vacuo*.—Ignatov, **3574.**
Synchronisation of **Thyratron** Oscillator.—Gulyaev, **2402.**
High-Speed Multiplex System for Loaded Submarine Cables [particularly Use of **Thyratrons**].—Haglund & Breyfogel, **319.**
Ionisation Time of **Thyratrons** [and Grid-Glow Tubes].—Harrison, **4025.**
Relation of Residual Ionisation to Arc-Back in **Thyratrons.**—Kingdon & Lawton, **803.**
Single-Valve **Time-Base** Circuit, adaptable for Saw-Tooth or Rectangular Wave-Forms.—Fleming-Williams, **2401.**
Amplifier—**Time-Base.**—Southern, **4397.**
" Transducer " and Applications.—Lamm, **4047.**
Limitation of **Transformer** Noise.—Churcher & King, **2756.**
Elimination of **Transformer** Noise.—Norris, **2041.**
Most Economical **Transformer.**—Unger, **2458.**
Nomograms for Mains **Transformers** in Low-Power Radiotechnical Apparatus.—Crescini, **3800.**
Surge-Proof **Transformers.**—Kimura & Yokosuka, **4059.**
Transformation : see Conversion, Impulse.
Electric-Circuit **Transient Analyser.**—Peterson, **370.**
Starting Characteristics of **" Trigger "** Tube with Radioactive Cathode.—Nottingham, **1594.**
Ultra-High, -Short : see Crystal-Detectors, Discharges, Electron-Beams, Iron, Liquids, Molybdenum, Nickel, Oscillography, Permeability, Polystyrene, Solutions, Very-High, Water-Vapour.
Method for Opening Tube in **Vacuum.**—Brady, **3166.**
Admission of Pure Gases to **Vacuum** Systems.—Jossem, **3165.**
Rubber-Lined Tapered **Vacuum** Joint.—Kersten & Chace, **300.**
Vacuum Leak Testing.—Manley, Lawton, **1179** & **3161.**
Modern **Vacuum** Practice in Electronics.—Morse, **779.**
Friction in a **Vacuum.**—Rakov & Sokolova, **1584.**
Automatic Pirani **Vacuum** Gauge.—Scott, **781.**
Vacuum Technique : see Barium, Book-Review, Bushings, Capillary, Gauge, Gettering, Joining, Manometer, Materials, Mercury, Pump, Sealing, Strain-Analyser, Valve, Vapour-Traps.
Self-Seating **Valve.**—Marvell, **3164.**
Construction and Cooling of Large **Vapour Traps.**—Northrup & others, **4021.**
Varistors : Characteristics and Uses.—Becker, **4043.**
Vectographs : Images in Terms of Vectorial Inequality and Their Application.—Polaroid Corporation, **3538.**
Vector-Response Indicator [giving Direct Indication of Magnitude & Phase Angle].—Loughlin, **3537.**
Very High : see Discharge, Liquids, Magnetisation, Permeability, Ultra-High.
New Type of D.C./A.C. **Vibrator** Inverter.—Kiltie, **3183.**
L.T. to H.T. **Vibrators** with Synchronous Rectification.—Semenov, **327.**
Vicalloy, New Permanent-Magnet Material.—Nesbitt & Kelsall, **4057.**
Plastic Hysteresis and Variable Magnetisation : Magnetic **Viscosity,** *and* Possible Mechanism of Magnetic **Viscosity.**—Gilbert : Perrier, **844.**
Magnetic **Viscosity** of Single Crystals of Iron, *and* Effect of Special Heat Treatment on Magnetic Permeability of Nickel-Iron Alloys.—Nishina, **3198.**
Direct-Acting Generator-**Voltage** Regulator.—Boice, **2019.**
Two-Stage **Voltage** Stabiliser.—Gill, **295.**
Valve-Controlled **Voltage** and Frequency Stabilising Equipments.—Kelbe, **2752.**
Electronic **Voltage** and Speed Control of Alternators.—Piddington, **1617.**
Voltage Control with Non-Linear Wheatstone Bridge.—Richter, **4040.**
Voltage Regulator using Thermionic Valves.—Ruberti, **4039.**
Supply-Mains **Voltage** Fluctuations and Power Consumption of Commercial Lamps.—Strauch, **1618.**
Amplifier **Voltage** Supply.—Witting, **3187.**
Voltage Regulation : see also Automatic, Compensator, Regulation, Stabiliser, Thermistor, Varistor.
Working of **Voltaic Apparatus** [Primary Cells & Accumulators].—Reiffer, **2020.**
Water Solution in High-Voltage Dielectric Liquids.—Clark, **4457.**
Dielectric Constant of **Water Vapour** at Frequency of 42 Megacycles per Second.—Tregidga, **2419.**
Behaviour of **Willemite** under Electron Bombardment.—Piore & Morton, **1992.**
Optical Set-up for Measurement of Bubble-**Window** Thickness.—Green, **290.**
Manganamron **Wire, 4422.**
Dustless **Wire** Stripper with Vacuum Waste Collector, **4077.**
New Results with **Wires** and Cables Insulated and Sheathed with Synthetic Materials—Berger, **2432.**
Wires and Cables with Very Thin Foil Insulation.—Fischer, **2739.**
Straightening Thin Tungsten **Wires.**—Morgan, **1229.**
Continuous Breakdown Test for Enamelled **Wire.**—Pape, **1622.**
Synthetic Materials as **Wire** Insulation [particularly " Formex "].—Patnode, **340.**

Subsidiary Apparatus and Materials—

Heat Dissipation of Nichrome **Wire.**—Shimizu & Nishifuji, **1625.**
Measurement of Plastic Deformation of **Wires** with Synthetic Insulation under Conditions of Crushing and Heat.—Viehmann, **1621.**
Self-Supporting Ribbon Variant of Litz **Wire.**—Ward & Pratt, **389.**
Phenomena of Melting and Vapourising **Wires** with Very High Current Densities.—Wrana, **852.**
Wires : see also Corrosion, Glass, Screening, Temperature.
Electron **Work Function** and Mean Scattering Time.—Müller-Strobel, **1189.**
Applications of **X-Ray** Technique to Industrial Laboratory Problems [Fluorescent Screens, etc.].—Rooksby, **4018.**
X-Rays : see also Alloys, Goniometer, Photographic, Polymers, and under "Miscellaneous."

STATIONS, DESIGN & OPERATION

Radioelectricity in **Aeronautics.**—Laveran, **2072.**
Aircraft Radio Vibration : Mechanical Insulation of Radio Equipment against Aircraft Vibration.—Hallmann, **4088.**
Aircraft : see also Aeronautics, Book-Review.
Amateur : see Antarctic, Chile-Conference.
Broadcasting Centre "Radio-**Andorra.**"—Adam, **1652.**
Byrd **Antarctic** Expedition to use Amateur Radio.—De Soto, **860.**
Asymmetric-Sideband Broadcasting.—Koomans, **857.** See also Selective.
Automatic : see Time, Water-Stage, Weather.
Baldock Radio-Telephone Receiving Station.—Evans & Luckhurst, **3215.**
Present Position of **Baudot** Telegraphy on Short Waves —Prieur, **1249.**
"Zeitsignale" [Time Signals : **Book Review**].—German Admiralty, **862.**
"Aircraft Radio and Electrical Equipment" [**Book Review**].—Morgan, **3218.**
Broadcasting in Germany : News from Former Berlin Correspondent, **1247.**
Monitoring of **Broadcasting** Transmitters [Sottens Station], **2466.**
New National Station of French **Broadcasting** at Allouis (Cher).—Adam, **379.**
Long-Distance **Broadcasting.**—Ashbridge, **2071** & **3212.**
50-Kilowatt **Broadcast** Station utilising Doherty Amplifier and designed for Expansion to 500 Kilowatts [WHAS, Louisville].—Doherty & Towner, **378.**
High-Frequency **Broadcast**-Station Field-Coverage Survey [W8XNU].—Leydorf & others, **2463.**
Timing Carrier Breaks [at **Broadcasting** Stations].—Remley, **1654.**
Building World's Farthest-North **Broadcast** Station [KFAR, Alaska].—Wallace, **4086.**
Broadcasting : see also Andorra, Asymmetric, Compression, Frequency-Modulation, Location, Repeater, Scintillation, Selective, Short-Wave, South-African, Wire.
Burning Down of Schwarzenburg Short-Wave Transmitting Station, **2470.**
Narrow-Band **Carrier** Telephony.—Csepely, **2766.**
Chile Conference.—Budlong, **2771.**
Application of **Composite Modulation** to Problems of Sideband-Width Contraction.—Hayasi & Yamagiwa, **2459.**
Compression with Feedback.—Stewart & Pollock, **2768.**
Selective Calling Device for **Distant Control** by Wireless.—Blaszczyk, **2073.**
Distant Control : see also Remotely.
Duplex Operation on Single Aerial.—Builder, **1246.**
Special Method for Increasing **Efficiency** of Radio-Communication.—Tetelbaum, **1244** & **2460.**
Frequency Modulation : Revolution in Broadcasting ? **2765.**
Use of **Frequency Modulation** for Multiplex Service.—Armstrong, **2068.**
Recent Advances in **Frequency Modulation.**—Armstrong, **2461.**
Frequency Modulation.—Chaffee, **2066.**
Service Range at **Frequency Modulation.**—Crosby, **1644** & **3619.**
Wide-Band **Frequency Modulation** in Amateur Communication.—Grammer & Goodman, **1646.**
Narrow-Band *versus* Wide-Band in **Frequency-Modulation** Reception.—Levy, **4078.**
Theoretical Consideration of **Frequency Modulation.**—Maeda, **3617.**
New **Frequency-Modulated** Transmitter of WDRC-W1XPW, *and* Observations on Coverage with **Frequency-Modulated** Waves.—McLeod : de Mars, **3208.**
Detection of **Frequency-Modulated** Oscillations.—Milstein, **2462.**
Interference between Stations in **Frequency-**Phase-**Modulation** Systems.—Pollack, **3618.**
Frequency Modulation : Success of Triple Relay Experiment.—Warner, **1243.**
Frequency or Amplitude **Modulation** ? Interesting Comparisons from America.—Weir, **2067.**
Frequency Modulation [Survey].—Yocum, **1645.**
Frequency Modulation : see also Composite, Efficiency, Relay, and under "Transmission" and "Reception."
Government Regulation of Radio.—Jolliffe, **2472.**
Medium-Power Marine Radiotelephone Equipment [for Communication with **Harbour & Coastal** Services].—McDonald, **376.**
Telephone Broadcasting : **Line** Distribution at Radio Frequency.—Walmsley, **2464** & **4083.**
EW-Telephony Long-Distance Connections in "Line Traffic" on High-Tension **Lines.**—du Mont & Baranowsky, **1650.**
Selection of Radio-Broadcast-Transmitter **Location.**—Lodge, **377.**
Radio over **Mains :** Eckersley's Lecture to E.P.E.A's London Technical Group, **1648.**
Broadcasting over Power **Mains, 373.**
Marine Telephone for Small Boats [for Communication with Coastal Exchange Stations].—Taylor, **4085.**
Marine : see Baldock, Harbour, Remotely-Controlled, Ships.
Mobile Stations : see Parachute, Portable, Ultra-High, Vehicular.
Differential **Modulation Meter.**—Gunsolley, **2769.**
Multiplex Carrier Telephony on Ultra-Short Waves at Strait of Tsugaru.—Matsumae, Yonezawa, & Kurokawa, **4460.**
Studies on Ultra-Short-Wave Transmitters for **Multiplex** Telephony.—Yonezawa & Tanaka, **4461.**
Reciprocating Multiple Transmission (**Multiplex** Transmission).—Raabe, **859.**
Radio for **Parachute** Fire-Fighters, **4082.**
Boston **Police** Radio, **1647.**
Compact 112-Mc. Station : Complete Unit for **Portable** or Mobile Use, *and* 56-Megacycle Mobile Station.—Lawrence : Lynch, **3209.**
Modern **Radio-Telegraph** System, Argentina.—Noizeux, Krähenbühl, & Novics, **3214.**
Measuring Impedance of Broadcasting [**Rediffusion**] Feeders.—Meerovich, Lebedev & Nikonov, **3211.**
500-Megacycle [Frequency-Modulated] Radio-**Relay** Distribution System for Television.—Kroger, Trevor, & Smith, **4080.**
Remotely Controlled Radio Receiver, *and* **Remote Control** of Radio Systems.—McKennie : Pruden, **1651.**
Remotely Controlled Radio Receiving Systems.—Mossman & others, **2471.**
Remotely Controlled : see also Distant.
Modern Broadcast **Repeater** Equipments.—Meers & Filby, **1248.**
QST visit **Riverhead and Rocky Point, 4462.**
Safety Rules for Radio Installations.—Nat. Bureau of Standards, **2076.**
Cleveland's Ultra-High-Frequency **School** Radio System.—Woodward, **372.**
Scintillation [Rapid Fluctuation of Carrier Frequency].—Koike, **1245.**
Secrecy by Inversion of Syllables.—Marro, **2468.**
Secret Messages by Radiotelephone.—Kotowski & Dannehl, **4464.**
Television Detail and **Selective-Sideband** Transmission.—Goldman, **856.** See also Asymmetric, Single.
Office **Separating Filters** for Wire Broadcasting.—Dold & Ohlrogge, **3210.**
Separating Filters.—Piloty, **374.**
Trends in Application of Electricity in British **Ships.**—Watson, **2074.**
Short-Wave Broadcasting Stations, arranged in Order of Frequency, **4084.**
New Swiss National **Short-Wave** Broadcasting Station at Schwarzenburg.—Abel, **1653.**
Bearing of Recent Ionospheric Studies on Commercial **Short-Wave** Communication.—Ohno, **2469.**
Short-Wave : see also Broadcast.
Siemens-Hell Printer [Later Developments].—Berck, **2767.**
Effect of Quadrature Component in **Single-Sideband** Transmission.—Nyquist & Pfleger, **2069.** See also Asymmetric, Selective.
South African Broadcasting Equipment [Panorama Rebroadcasting Station], **3213.**
Absorption of Radio Waves in Water [Communication with Submerged **Submarines**].—Hoag, **375.**
Old and New Technique of **Telegraph** Apparatus.—Wüsteney, **3216.**
Through Traffic in **Teleprinting** *via* **Wireless** and Cables.—Hudec, **858.**
Television : see Relay, **Selective.**
Automatic **Time** and Weather Systems.—Winner, **861.**
Automatic **Time** Signals.—Batteau, **2772.**
Time : see also Book-Review.
Battery **Transceiver** for 112 Mc/s, *and* 56-Mc/s Crystal-Controlled **Transceiver.**—Chambers : Jacobs, **2773.**
Two-Way Radio-Telephony : New "Two-Wire, Four-Wire" Control Terminal.—Marinesco, **2070** & **2467.**
Two-Way Telephonic Communication over 90 Miles with Ultra-Short Waves.—Mt. Washington, **4081.**
Ultra-High-Frequency Relay [Results of Contest].—Handy, **371.**
Ultra-High, -Short : see also Multiplex, Parachute, Police, Portable, School, Relay, Riverhead, Transceiver, Two-Way.
Vehicular Radio-Telephone Service.—Bell Tel. Company, **3621.**
Automatic **Water-Stage** Transmitters.—Kennedy, **2075.**
Weather by Telephone, *and* **Weather-**Announcing Tape Machine.—Bennett : Cushman, **1649.**
Automatic **Weather** Station.—Diamond & Hinman, **4087** & **4463.**
Transmission Features of **Weather** Announcement System.—Merrill, **3217.**
Weather : see also Time.

Stations, Design and Operation—

High-Frequency **Wire** Broadcasting in Germany.—Budischin & Deklotz, **2465.**
Influence of **Wire** Broadcasting on Form and Technique of Telephone Plant.—Waldow, **2770.**
Wire Broadcasting Investigations at Audio and Carrier Frequencies.—Walmsley, **2464** & **3620.**
Wire Broadcasting : see also Carrier, Line, Mains, Rediffusion, Separating.

GENERAL PHYSICAL ARTICLES

Adsorption : see Polarisation, and under 'Valves & Thermionics."
Atomic Constants : Revaluation and Analysis of Discrepancy.—Dunnington, **1257.**
Integro-Differential Equation of **Boltzmann.**—Lichnerowicz & Marrot, **3636.**
' Decline of Mechanism (in Modern Physics) " [**Book Review**].—d'Abro, **382.**
"Matter and Light : the New Physics" [**Book Review**].—de Broglie, **3624.**
"Mathematical Theory of Non-Uniform Gases" [**Book Reviews**].—Chapman & Cowling, **3635.**
"Ions, Electrons, and Ionising Radiations" [**Book Review**].—Crowther, **4099.**
"Statistical Thermodynamics" [**Book Review**].—Fowler & Guggenheim, **3634.**
"Mécanique ondulatoire de l'Électron et du Photon" [**Book Review**]—Géhéniau, **3234.**
"Electronic Processes in Ionic Crystals" [**Book Review**].—Mott & Gurney, **4472.**
"Introductory Quantum Mechanics" [**Book Review**].—Rojansky, **381.**
"Theory and Practice of Electron Diffraction" [**Book Review**].—Thomson & Cochrane, **872.**
"Theoretical Physics : Relativity and Quantum Dynamics. Einstein-Planck" [**Book Review**].—Wilson, **4101.**
Brownian Motion.—Brown, **1258.**
Brownian Movement and Einstein Formula.—Duclaux, **2478.**
Brownian Motion : see also Light.
Surfaces of Minimal **Capacity.**—Evans, **4467.**
Natural Unit of **Capacity** and Absolute Definition of Farad.—Laboccetta, **2082.**
Concentration of **Cations** at Negatively Charged Surfaces.—Webb & Danielli, **4095.**
Rate of Moving **Clock.**—Dingle, **4466.**
Neutralisation Cross-Section and Angular Distribution in **Collisions** between He+ and He.—Dallaporta, **3224.**
Corpuscles : see also Electrons, Lorentz, Magnetic, Mesons, Particle, Photon, Wave-Mechanics.
Quantum Physics of Solids : Energies of Electrons in **Crystals.**—Shockley, **866.**
Crystals : see Book-Review, and in other Sections.
Dimensions of Electromagnetic Quantities.—Sommerfeld, **863.**
Dissipation of Electricity in Enclosed Air Mass ["Geitel Effect."] Walter, **3223.**
Doppler Effect from Moving Mirrors.—Ives, **3625.**
" Electrical **Double Layer** " [Faraday Society's General Discussion]. **2080.**
Electrical **Double Layer** at Interface of Two Liquids.—Verwey & Niessen, **384.**
Generalisation of Maxwell's Relaxation Theory of **Elasticity** and Viscosity of Amorphous Bodies.—Frenkel & Obrastzov, **3237.**
Theory of **Electric Charge** and Quantum Theory.—Flint, **3228** & **3630.**
Electromagnetic : see Dimensions, Fields, Gravitational, Magnetism, Propagation, Thermodynamics.
Electromagnetism : Some Observations on Fundamentals.—Howe : Cullwick, **1260, 1261,** & **2782.**
Graphical Representation of Relations between **e**, *m*, and *h*.—Birge, **2779.**
Evaluation of Constants **e**, *h*, *m*.—Darwin, **2474** & **3632.**
Thermionic Measurement of **e/m.**—Gager, **4098.**
New Determination of Specific Charge on **Electron** by Busch's Method [using Magnetic Electron Lens].—Goedicke, **387.**
Electronic Charge.—Laby & Hopper, **3221.**
Ratio of *c*, **e**, and *h* [Relation reduced to Eigenvalue Problem].—Landé, **2475.**
Existence and Magnitude of **Electronic** Charges.—Landé, **3629.**
Energy Losses of Fast **Electrons** [in Passage through Matter].—Alichanov & Alichanian, **3626.**
Radiative Stopping of Fast **Electrons** in Thin Layers.—Artzimovich & Bredov, **3627.**
Flint's Five-Dimensional Theory of **Electron.**—Band, **3631.**
Probability of Reversal of **Electron** Spin in Collisions in NO Gas.—Kneser, **1254.**
Equations of Motion of Point **Electrons** deduced from Variational Principle.—Lewis, **3628.**
Equations of Dirac-Madelung [and Magnetic **Electron**].—Yvon, **1659.**
Electrons : see also Book-Review, Crystals, Magnetic, Metals, Pair-Production, Scattering.
Electro-Physics : Review of Progress.—Campbell, **2081.**
Method of Solving Fundamental Problem of **Electrostatics** and Related Problems.—Grünberg, **4469.**
Electrostatic Field : see Point-Charge.
Equations of Motion in Electrodynamics.—Infeld & Wallace, **3230.**
Energy Fluctuations in Electromagnetic **Field.**—Morrison, **867.**
Correlation between Fundamental Equations of Gaseous-Dynamic and Electromagnetic **Fields.**—Riabouchinsky, **868.**
Replacement of Two "Three-**Finger**" Rules by Single Rule.—Herrmann, **2483.**
Thermal Transpiration of Dissociating **Gas.**—Srivastava, **4096.**
State Equation of Real **Gases.**—Vukalovich & Novikov, **1253.**
Velocity Distribution of **Gaseous** Molecules, and Table for obtaining Values of Error Function Complement.—Heatley, **3222.**
Gases : see also Boltzmann, Book-Review, Moist-Air, Thermodynamics.
Motion of Finite Masses according to Einstein's Theory of **Gravitation.**—Fock, **865.**
New Form of **Gravitational** Equations of General Relativity : Deduction of Undulatory Equations of Electromagnetic Field and of Material Field.—Caldirola, **1657.**
Characteristic Velocity of **Gravitational and Electrical Fields.**—Laboccetta, **3233.**
Hall Effect in Ferromagnetic Bodies.—Rudnitsky, **875.**
New Treatment of Electric and Magnetic **Induction.**—Burmiston Brown, **4470.**
Structure of Negative **Ion :** Determination of Nuclear Magnetic Moment.—Jonescu, **3220.**
Mobility of Potassium **Ions** at High Field Intensity and Low Pressure, *and* Theory for Mobility of **Ions** of High Velocity.—Hershey, **873.**
Second Townsend **Ionisation** Coefficient for Nickel Cathodes in Pure Hydrogen.—Hale, **874.**
Cross-Section for Change of Charge and **Ionisation** by High-Velocity Metallic Ions in Hydrogen and Helium.—Sherwin, **3225.**
Thermal **Ionisation** of Barium.—Srivastava, **2780.**
Ion, Ionisation : see Book-Review, Collisions, Pair-Production.
Kerr Effect : see Polarisation, and under "Phototelegraphy & Television."
Light incident on Particles falling in Magnetic Field produces Motion along Lines of Force, *and* **Light** can exert Attractive Force on Matter.—Ehrenhaft, **2477.**
Diffusion, Brownian Movement, Loschmidt-Avogadro's Number, and **Light.**—Ehrenhaft, **3622.**
The **Light** Field.—Gershun, **1662.**
Light : see also Book-Review, Photon, Photophoresis.
London-van der Waals Forces between Two Disc-Like Particles.—Dube & Dasgupta, **2781.**
Possible Modification of **Lorentz Forces.**—Caldirola, **2078.**
Properties of Electron Gas in **Magnetic** Field.—Achieser, **1250.**
Non-Adiabatic Processes in Oscillating **Magnetic** Field.—Caldirola, **2482.**
Magnetic Moments of Proton and Deuteron : Radio-Frequency Spectrum of H_2 in Various Magnetic Fields.—Kellogg & others, **871.**
Electrical Quadrupole Moment of Deuteron. Radio-Frequency Spectra of HD and D_2 Molecules in **Magnetic** Field.—Kellogg, Rabi, & others, **2776.**
Motion of Electrified Corpuscle in Presence of **Magnetic** Dipole.—Manarini, **1655.**
Electrodynamical Conception of **Magnetic** Energy.—Puccianti, **1658.**
Magnetic : see also Electron, Hall-Effect, Induction, Ion, Light, Radio-Frequency-Spectra, Senftleben.
Magnetism and Rotations.—Brylinski, **2083.**
Radiative Processes involving Fast **Mesons.**—Booth & Wilson, **4089.**
Mesons : see also Undor.
Electrical Conductivity of **Metals.**—Bardeen, **2084.**
Radius of Electron and Calculation of Photoelectric Constant of **Metals.**—Jonescu, **1660.**
Corpuscular Theory of Electrical Conductivity of **Metals.**—Jonescu, **2476.**
Dielectric Constant of **Moist Air.**—Koga, **3638.**
Potential **Momentum** and Momentum Fields in Dynamics.—Watson, **1663.**
Nuclear Fission.—Darrow, **3235.**
Nuclear Fission : see also Photo-Fission.
Pair Production by Electrons.—Feldmeier & Collins, **4093.**
Probability of **Pair Production** in Nitrogen by Gamma Rays, *and* Angular Distribution and Nuclear Impulse for **Pairs** in Nitrogen. Groshev, **4092.**
Pair Production of Mesotrons at 29 000 Feet.—Herzog & Bostick, **4471.**
Statistical Behaviour of Known and Unknown Elementary **Particles.**—Pauli & Belinfante, **2077.**
Particles : see also Corpuscles, Potentials (Retarded).
Photoelectric : see Metals.
Photo-Fission (as distinct from Neutron Fission) of Uranium 235 by Gamma Rays.—Westinghouse, **4100.**
Representation of Wave Equation and Evolution of Electromagnetic Quantities in Theory of **Photon.**—Petiau, **869.**

General Physical Articles—

General Theory of Elementary Corpuscles and Theory of **Photon.**—Petiau, **1256.**
Photon : see also Book-Review.
Photophoresis, Electrophoresis, and Magnetophoresis.—Ehrenhaft, **3623.**
Considerations concerning Fundaments of Theoretical **Physics.**—Einstein, **3232.**
Physics : see Book-Review, Electro-Physics.
Radiation from **Point Charge** revolving in Circular Orbit.—Poritsky, **2473.**
Electric Field produced by **Point Charge** located outside Dielectric Wedge.—Rice, **2079.**
Electrostatic Field produced by **Point Charge** in Axis of Cylinder.—Weber, **385.**
Theory of Electric **Polarisation,** Electro-Optical Kerr Effect, and Electric Saturation in Liquids and Solutions.—Piekara, **383.**
Polarisation of Molecules ; Application to Study of Adsorption and Greasiness.—Trillat, **3236.**
Polarisation : see also Scattering.
Positive Column in **Potassium** Vapour, *and* Probability of Excitation of Potassium Atom.—Klarfeld : Fabrikant, **3637.**
Complete Analytical Expression of **Potential,** *and* Natural Unit of **Potential** and Absolute Definition of Volt.—Laboccetta, **386** & **864.**
First-Order Wave Equation for **Potential** of Radiation Field.—Molière, **4468.**
Some Properties of Retarded and Advanced **Potentials.**—Podolsky & Kunz, **2778.**
Potentials : see also Momentum.
Symmetrical Electromagnetic **Propagation** in Relation to an Axis —Agostinelli, **1656.**
Gibbs **Quantum** Ensemble and Its Connection with Classical Ensemble.—Blochinzev, **3229.**
Quantum Electrodynamics.—Ginsburg, **1251.**
Quantic Emission in Phase in Region of Radioelectric Waves.—Ionescu, **2774.**
Difficulties and Developments in **Quantum Mechanics.**—Flint, **1252.**
Quantum Physics : see also Book-Review, Crystals, Electric-Charge, Field, Magnetic, X-Ray.
Fluctuations in Electromagnetic **Radiation** (Correction).—Born & Fuchs, **380.**
Natural Unit of Measurement for Phenomena of **Radiation.**—Laboccetta, **1661.**
Radio-Frequency Spectra of Atoms.—Kusch, Millman, & Rabi, **2775** & **3219.**
Diamagnetism and Quadrupole Moment of Hydrogen Molecules [Agreement between Theoretical & Experimental **Radio-Frequency Spectra**].—Ramsey, **4094.**
Radio-Frequency Spectra : see also Magnetic.
Theory of Generalised **Relativity** on Trial, **2480.**
Modification of a **Relativity** Postulate.—Sulaiman, **4465.**
Relativity : see also Clock, Gravitational.
Scattering of Fast Electrons by Nitrogen Nuclei.—Borisov, **4090.**
Polarisation of Electrons by **Scattering.**—Landau, **4091.**
Elastic Electron **Scattering** in Gases.—McMillen, **1255.**
Remarks on Analogy between **Schrödinger Differential Equation** and a Wave Equation.—Matossi, **2777.**
Theory of **Senftleben** Effect.—Zernike & van Lier, **389.**
Superconductivity.—Jackson, **2085.**
Observations on " Nature of Geometrical, Mechanical, and Physical Entities : Importance of Consideration of **Symmetries and Dissymmetries.**"—Karpen : Bouthillon, **870** & **2481.**
Thermodynamic Functions for Fermi-Dirac Gas.—Stoner, **4097.**
Themodynamics and Lowest Temperatures.—Darwin, **3633.**
Thermodynamics of Electromagnetic Phenomena.—Kneissler-Maixdorf, **1259.**
Thermodynamics : see also Book-Review.
Undor Calculus and Charge-Conjugation ; *also* **Undor** Equation of Meson Field; *and* Spin Angular Momentum of Mesons.—Belinfaute, **388.**
Covariant Derivative of Tensor-**Undors.**—Belinfante, **2479.**
Wave-Equation : see Photon, Potential, Schrödinger.
Attempt at Synthesis between **Wave Mechanics** and Corpuscular Mechanics.—Planck, **3231.**
New **X-Ray** Effect.—Raman & Nilakantan, **3226** & **3227.**

MISCELLANEOUS

Mathematics, Statistics, etc. : see below.
Mathematical Representation of **" After-Effect "** Phenomena, and in particular of Hysteresis.—Kovalenkov & Machinski, **4495.**
Theory of **Algebraic Complex Operators,** with Applications to Electric Circuit Theory.—Hirst, **1669.**
Cathode-Ray Oscillograph as **Algebraic Curve Tracer.**—Tanaka & Nagai, **1288.**
Algebraic Equations with Complex Coefficients.—Hitchcock, **1668.**
Values of **Bessel Functions** ber x and bei x and Derivatives.—Dwight, **3248.**
Book Reviews.—" American Mathematical Society Semicentennial Publications, **4492 ;** " Determinants and Matrices," " Integration," " Integration of Ordinary Differential Equations," and " Vector Methods."—Aitken & others, **1263 ;** " Statistical Mathematics," *and* " Probability and Frequency."—Aitken : Plummer, **3242 ;** " Higher Mathematics : with Applications to Science and Engineering."—Burington & Torrance, **399 ;** " New First Course in the Theory of Equations."—Dickson, **4109 ;** " Wahrscheinlichkeitsrechnung für Nichtmathematiker " [Probability Calculation for Non-Mathematicians].—Dörge, **380 ;** " Neuere Rechenverfahren der Technik " [Part I : Solution of Applied Differential Equations by Laplace Transformation].—Droste, **1265 ;** " Theory and Use of Complex Variable " [for Technical Problems].—Green, **4489 ;** " Aspects of Calculus of Variations."—Green, Lewy, **4108 ;** " Introduction to Vector Analysis."—Hague, **4490 ;** " Schaltschemata und Differential-gleichungen [Vibrating Systems].—Hecht, **3241 ;** " Differential-gleichungen der Technik und Physik."—Hort (edited by Thoma), **882 ;** " Mathematical Methods in Engineering."—von Karman & Biot, **3243 ;** " Vektor- und Dyadenrechnung für Physiker und Techniker.—Lohr, **2485 ;** " Complex Variable and Operational Calculus."—McLachlan, **398 ;** " Tables for Converting Rectangular to Polar Co-ordinates."—Miller, **883 ;** " Tables of the Exponential Function e^x."—Nat. Bureau of Standards, **4494 ;** " Two-Dimensional Potential Problems connected with Rectilinear Boundaries."—Seth, **4488 ;** " Statistical Method from Viewpoint of Quality Control."—Shewhart & Deming, **3647 ;** " Advanced Calculus," *and* " Advanced Calculus."—Sokolnikoff : Stewart, **4491 ;** " Tafeln und Aufgaven zur Harmonischen Analyse und Periodogrammrechnung."—Stumpff, **2089 ;** " Orthogonal Polynomials."—Szegö, **3244 ;** " Operatoren-rechnung nebst Anwendungen in Physik und Technik."—Wagner, **2484 ;** " Mathematics applied to Electrical Engineering."—Warren, **881.**
Conformal Theory of Curves.—Fialkow, **4487.**
Distribution of Root-Mean-Square of Second Type of Multiple **Correlation Coefficient.**—Roy & Bose, **4496.**
Application of Properties of Three Types of **Determinants** to Calculation of Natural Frequencies of Coupled Oscillating Systems.—Parodi, **4483.**
Bush **Differential Analyser** and Applications.—Hartree, **4499.**
Asymptotic Laws of Distribution of Real Roots of Oscillatory Integrals of Linear **Differential Equation** of Second Order.—Sarymsakoff, **2086.**
Hystero-**Differential Equation** arising in Probability Problem.—Silberstein, **2091** & **4476.**
Note on Solution of Partial **Differential Equations** in Finite Domain —Howell, **393.**
Solving Second Order Simultaneous Linear **Differential Equations** using Mallock Machine.—Wilkes, **2788.**
Solution [by Laplacian Methods] of Linear Difference **Differential Equations.**—Heins, **3642.**
Periodic Solutions of Non-Linear **Differential Equations** of Parabolic Type.—Karinov, **3643.**
Errors in Numerical Solution of **Differential Equations,** *and* Two Notes on Numerical Solution of **Differential Equations.**—Turton, **4106.**
Relations between **Elliptic Cylinder Functions.**—Ince, **395.**
Equation $d^2 \log y/dx^2, = 1 - y$ when $y > 0$.—Carson & Richardson, **877.**
Formulation of **Experimental Law :** Calculation of Coefficients of Formula : Determination of Mean Value of Experimental Function, etc.—Vernotte, **2092** & **2487.**
Analysis of Compound **Exponential Curves.**—Hancock, **397.**
New Properties of Bohr Almost-Periodic **Fourier Series.**—Takahashi, **1671.**
Approximation to **Function of One Variable** from Set of Mean Values.—Greenspan, **391.**
Method of Symmetrical Components Applied to **Harmonic Analysis.** —Pipes, **2090.**
Harmonic Analysis by Method of Central Differences.—Espley, **4103.**
Significance-Test for Ellipticity in **Harmonic Dial** [representing Fourier Coefficients from Harmonic Analysis].—Mauchly, **3645.**
Note on **Heaviside's** Expansion Theorem.—Miller, **3245.**
Formulae for Generalised **Hypergeometric** Functions as Particular Cases of More General Formulae.—MacRobert, **396.**
Symbolic Representation of **Impedance and Admittance.**—G.W.O.H., **2095.**
Application of Polynomial Approximation to Solution of **Integral Equations** arising in Physical Problems.—Crout, **1670.**
Pathological Case in Numerical Solution of **Integral Equations.**—Pekeris, **4479.**
Integral Equations of Continuous Dynamical Systems.—Ingram, **4480.**
Cinema **Integraph :** Machine for Evaluating Parametric Product Integral.—Hazen & Brown, **4107.**
Mechanical **Integration** of Differential Equations.—Rosseland, **1266.**
Graphical **Integration** of Linear Differential Equation of Second Order.—Nagai, **1672.**
Double Graphical **Integration** of Non-Linear Equations of the Second Order.—Livshits, **4481.**
Mechanical **Integrator** for evaluating Integral of Product of Two Functions, and Application.—Van den Akker, **392.**
Differential Operators acting as **Integrators.**—Silberstein, **3644.**

Miscellaneous—

Investigation of **Integrimeter** after A. Ott.—Werkmeister, **1267.**
Note on **Laguerre Polynomials.**—Howell, **4104.**
Laguerre Series [and Certain Convergence Properties].—Greenwood, **4477.**
Integral Representations of Associated **Legendre Functions.**—Erdélyi, **4478.**
Addition and Subtraction **Logarithms.**—Addey, **3249.**
Recent **Mathematical Machines.**—Walther, **2088.**
Mathematical Societies of Great Britain.—Stigant, **2094.**
Mathematical Tables.—Nat. Bureau of Standards, **4493.**
Matrices and Dyadics.—Sah, **4485.**
Application of **Matrix Calculation** in Electrotechnics.—Strecker, **2785.**
Matrix Theory of Oscillatory Networks.—Pipes, **1262.**
Foundation and Import of Heaviside **Operational Calculus.**—Wagner, **1665.**
Operational Calculus for Technical Problems, *and* Elements of Functional Calculus for Calculation of Electrical Systems.—Ghizzetti : Blanchi, **1666.**
Partial Derivatives of Derivatives : Partial Derivatives of Slope of Straight Line.—Kimball, **4486.**
Theorems of **Perturbation** Theory, and particularly Application in Theory of Non-Stationary Processes in Electronic Valves.—Grünberg, **3640.**
Resultant Intensity of Vibrations whose **Phase Differences** are at Random.—Nakagami & Ohno, **879.**
Probable Error for **Poisson Distributions.**—Rodgers, **2784.**
Poisson Integral and Applications to Theory of Linear A.C. Networks.—Cauer, **2783.**
Polynomial of Mittag-Leffler.—Bateman, **4482.**
Principles of Mechanical Method for calculating **Regression Equations** and Multiple Correlation Coefficients, and for Solution of Simultaneous Linear Equations.—Schumann, **3238.**
Relaxation Methods applied to Engineering Problems.—Gandy, Pellew, Southwell, **878, 2488,** & **3246.**
Electrical Method for Compounding **Sine Functions.**—Maxwell, **2087.**
Square Root Extractor.—Green, **4498.**
Statistics and Engineering Practice, *and* **Statistical** Methods and Factors of Safety.—Dudding & Jennett : O'Dea, **1673** & **3646.**
Statistical Considerations on Acceptance Tests on Samples.—Lucchi, **2486.**
New Method in **Statistical Mechanics.**—Wiener & McMillan, **390.**
Transient Analysis by Method of **Symmetrical Components** [and Laplacian Transformations].—Pipes, **4484.**
Construction of **Technical Diagrams** of High Mathematical Order by means of Simple Geometrical Relations.—Winkel, **3240.**
Application of **Tensor Concept** to Complete Analysis of Lumped, Active, Linear Networks.—Epstein & Donley, **876.**
Time Distribution of So-Called Random Events.—Feller : Ruark, **3239.**
Mechanical Appliance for Smoothing of **Time Series.**—Schumann, **4497.**
Transient Phenomena due to Starting and Stopping of Currents in Electric Circuits [Abridged Methods of Calculation].—Giorgi, **1667.**
New Criteria for Determination of Class of **Trigonometric Series.**—Kharchiladze, **4105.**
Vector Conversion Chart.—Gruenberg, **884.**
Natural Frequencies of **Vibrating Systems,** *and* Relaxation Methods applied to Engineering Problems.—Southwell : Pellew & Southwell, **1264** & **2488.**
Analysis of Symmetrical **Vibrating Systems** [using Methods of Laplacian Transformation and Matrix Algebra].—Pipes, **2786.**
Error in "Certain **Vibration Problems** Solved by means of an Analogous Problem in Heat Conduction."—Green, **3247.**
Correspondence on Damping-Coefficient Term of **Vibrational Equation,** 2787.
Solving **Wave Equation** in Region with Perturbed Boundaries.—Feshbach & Clogston, **3641.**
Formulae for Product of Two **Whittaker Functions** with Different Arguments.—Howell, **394.**

OTHER MISCELLANEOUS

Aircraft Radio Vibration : Mechanical Insulation.—Hallmann, **4119.**
Use of **Air-Jet Bolometer,** 2806.
Modified Capacity Bridge for **Airscrew** Tests.—Smith, **3696.**
Amplidyne Generator—Dynamoelectric Amplifier for Power Control.—Alexanderson, **2498** & **3700.**
Direct-Current and Audio-Frequency **Amplifier.**—Black & Scott, **4136.**
High-Gain D.C. **Amplifier** for Bioelectric Recording.—Goldberg, **2832.**
Balanced Direct-Current **Amplifier** for Alternating-Current Operation.—Stair & Hand, **4541.**
Measurement of Low-Speed Air Flow by Thermoelectric **Anemometer.**—Wassiliew, **1688.**
Glow-Discharge **Anemometer.**—Zacharov, **2856.**
Emission and Absorption of Ultra-Short Waves by **Atoms :** Detectable Differences in Magnetic Properties : etc.—Rabi, **2106.**
Automatics & Telemechanics.—Monthly Bibliography, **4523 ;** Evdokimov, **4527** (Current-Compensating Circuit for Remote Indication) ; Gutmann, **2857** (Remote-Control Relays) ; Klyuev, **4526** (Electronic Controlling Devices without Contacts) ; Kovalenkov, Dyakov, **4146** (Travelling Waves) ; Ladygin & Denisov, **2103** (H.F. Commutator for Remote Control of Aeroplanes ; Rubin, **4525** (Bridge controlling Servo-Motor) ; Zernov, **4524** (C.R. Tubes used in Electron Commutators). See also Control, Time-Telescope, Water.
Biological, Medical, etc.—Book Reviews (Vallardi, "Marconiterapia," **2825 ;** Warcollier, "Experiments in Telepathy," **4512 ;** Harvey, "Living Light," **4516**). See also Amplifier, Cardiophones, Cosmic-Rays, Decimetric, Electric, Electron-Microscope, Encephalography, Energy, Fungi, Gurwitsch, Haemoglobin, High-Frequency, Ionising, Liesegang, Luximeter, Magnetic-Field, Meteropathy, Nerve, Nervousness, Oscillographic, Penetration, Physics, Potentials, Radio-Therapy, Radium-Exposure, Relaxation, Snake, Sterilisation, Stimulator, Ultra-Short, Ultrasonics, Ultra-Violet, Vegetable, Vocal-Cords, Water.
New **Books** on Science [List for Jan./June 1940], **4116.**
Book Reviews.—"Electrical Communication."—Albert, **4507 ;** "Il Manuale . . ." [for Wireless Mechanics & Repairers].—Angeletti, **1741 ;** "History of Institution of Electrical Engineers."—Appleyard, **1724 ;** "Radio Amateur's Handbook, 1940."—A.R.R.L. Headquarters Staff, **2795 ;** "B.B.C. Handbook for 1940," **3649 ;** "Radio and Telecommunications Engineer's Design Manual."—Blakey, **402 ;** "Quantitative Spectrographic Analysis with the Microphotometer : Part I—A Review of Published Work."—British Non-Ferrous Metals R.A., **3681 ;** "Production and Direction of Radio Programs."—Carlisle, **2793 ;** "Rutherford : being the Life and Letters of the Rt. Hon. Lord Rutherford, O.M."—Eve, **1664 ;** "Photoelectric and Selenium Cells : Second Edition" [including Industrial Applications].—Fielding, **4165 ;** "Die Photozelle in der Technik."—Geffcken & Richter, **3673 ;** "Mitteilungen aus der Forschungsanstalt der Deutschen Reichpost" [German P.O. Research Department (First Half of 1939)], **2494 ;** "Contributions from Physical Laboratories of Harvard University for 1938," **4504 ;** "Telephony : Supplement to Volume 2."—Herbert & Proctor, **4185 ;** "Records and Research in Engineering and Industrial Science."—Holmstrom, **3252 ;** "Engineers' Manual."—Hudson, **1723 ;** "Drake's Cyclopedia of Radio and Electronics."—Manly & Gorder, **4508 ;** "High-Frequency Alternating Currents."—McIlwain & Brainerd, **2794 ;** "Radiotecnica : Volume II—Tubi eletronici."—Montù, **1742 ;** "National Physical Laboratory : Report for 1939," **3263 ;** "Writing the Technical Report."—Nelson, **4501 ;** "Science since 1500 : Short History of Mathematics, Physics, Chemistry, and Biology."—Pledge, **4505 ;** "The 'Radio' Handbook."—Staff of *Radio*, **4183 ;** "Radio at Ultra-High Frequencies."—R.C.A. Laboratories, **4509 ;** "Theory and Applications of Electron Tubes" [Reply to **Book Review**].—Reich, **447 ;** "Physico-Chemical Methods."—Reilly & Rae, **3648 ;** "Electronic Structure and Chemical Binding."—Rice, **4506 ;** "Scientific Journal of Royal College of Science, Vol. X," **4503 ;** "Funktechnische Formelsammlung" [Radio-Engineering Formulae].—Schmid & Leithiger, **1270 ;** "Introduction to Chemical Physics."—Slater, **4181 ;** "Static and Dynamic Electricity."—Smythe, **400 ;** "Modern Physical Laboratory Practice."—Strong & others, **4182 ;** "Photowiderstände" [Construction & Properties of Selenium, Selenium/Tellurium, & Thallofide Photocells : Their Applications in Laboratory & in Practice].—Thirring & Fuchs, **1706 ;** "Recollections and Reflections."—J. J. Thomson, **3639 ;** "VDE-Fachberichte 1938."—Verband Deutscher Elektrotechniker, **2800 ;** "Lehrbuch der Hochfrequenztechnik."—Vilbig, **401** & **4180 ;** "Handbuch des deutschen Rundfunks 1939/1940."—Weinbrenner, **3264 ;** "Radio's Master Encyclopedia" [Directory, Catalogues, etc.], **4184.** See also Convention, Electron-Microscopes, Infra-Red, Météoropathologie, Ultra-Short, Vocabulary.
Recording System designed for Investigation of Electrical Relations in **Brains** of Small Animals.—Woonton, **2831.**
Locating **Buried Cables and Pipes.**—Marcroft, **4145.**
Cable-Fault Localisation.—**4124** (Numakura & Tukamoto) ; **4522** (Savage).
Cardiophones of Various Types.—Giulietti, **2105.**
Carrier-Current Working.—**890, 1715, 1717, 1718, 2843, 2845, 2847, 2848, 3716, 3717, 4120, 4121, 4123.**
Practical Application of **Cathode-Ray Tubes.**—Hollins, **1668.**
Application of **Cathode-Ray Tubes** in Mass Production.—van Suchtelen, **1699.**
Rapid **Chemical Analysis** with Oscillograph or Measuring Bridge as Indicator.—Boeke & van Suchtelen, **1289.**
Electrometric Measuring Methods, for Watching & Control of **Chemical Processes,** etc.—Wengel, **2852.**
Vacuum Tubes in **Chemical Research.**—Penther & Pompeo, **4173.**
Coil Tester [for Short-Circuited Turns or Insulation Faults in H.T. Coils].—Dickinson, **1299.**
Four-Filter Photoelectric **Colorimeter.**—Barnes, **441.**
Colour Matching in Industry : New Colour Comparator.—Sargrove, **4160.**

Miscellaneous—

Application of Sonic Method to Freezing and Thawing Studies of **Concrete.**—Hornibrook, **1693.**
Industrial Utilisation of Electrochemical **Condenser.**—André, **3701.**
New Radio **Control** Gear for Model Airplanes.—Bohnenblust, **4147.**
Remote **Control** of Model Boat.—West, **4528.**
Radio-**Controlled** Model Aeroplane which has made over One Hundred Successful Flights.—Good, **2858.**
Radio-**Controlled** Seadrome Lights, **4148.**
Control: see also Air-Jet-Bolometer, Amplidyne, Automatics.
Conventions, etc.—I.R.E., 1939 (New York), **887 ;** I.R.E., 15th Annual C (Boston), **3650** & **4502 ;** International Telecommunication C., **1720 ;** "Proceedings of World Radio C., Sydney, 1938" [Book Review], **886 ;** see also "Discussers," German, I.R.E., Scientific Meetings.
Corrosion Tests in Communication Apparatus.—Franz, **1732.**
Experimental Results on Biological Action of **Cosmic Rays.**—Eugster & others, **2110.**
Electronic **Counting Circuits** [for Mass Production Processes, etc.], **4166.**
Electrical Properties of Blood under the Action of **Decimetric** Waves.—Malov, **2113.**
Anomaly in Electrical Conductivity of Concentrated NaCl Solutions in Region of **Decimetric** Waves.—Malov, **2828.**
Control of Wireless Transmitters and Other Electrical Apparatus under **Defence Regulations,** 1939.—Gould, **3251.**
Linear **Densitometer.**—Tiedeman, **3269.**
Push-Pull Photoelectric Photo-**densitometer** for determining Fine Structure in Ultra-Violet Absorption Spectra.—Loofbourow, **1277.**
Detection : see Magnetic, Mercury-Vapour (under Photocell-Applications), Metal (in Logs).
Some Types of **"Discussers"** [at Technical Meetings].—Karapetoff, **424.**
Distance and Velocity Meter based on Curious Optical Effect.—Lau, **2500.**
Water-**Divining, etc.**—Baumeister, **897** & **1678 ;** Maby, Franklin, **1283** & **2835 ;** Macbeth, **1282.**
Documentation, Scientific Papers, etc.—Compound Words & Their Difficulties, **423** & **3257 ;** International Conference on Documentation, **425 ;** Ageing of Record Papers, **426 ;** Libraries & Information Bureaux of B.B.C., **429 ;** Graphical Symbols in Power & Communication Engineering, **885 ;** L'Onde Electrique Bibliographical Service on Cards, **1300 ;** Filing of Microfilms, **1728 ;** Symbols for Electrical Communication (Inst. Galileo Ferraris), **2097 ;** Authors' Abstracts, **2491 ;** Documentation in Italy & France, **2492, 2493,** & **2790 ;** Efficiency in Documentation (Bradford), **2791 ;** "Aslib" War-Time Guides, **3253 ;** Engineering Societies' Library Services, **3254 ;** Microfilm with Candid Camera, **3255.** See also Book Review, Institute, Literature, Scientific, Vocabulary.
Investigation of **"Dry Friction"** Forces.—Khaikin & others, **2809.**
Effect of Electrization of **Earth Layers** by Elastic Waves passing through Them.—Ivanov, **2115.**
Practical Aspects of **Earthing.**—Fawssett, **2117.**
Determining **Elastic** Constants of Isotropic Solid Bodies with Help of Supersonic Waves.—Bär, **2838.**
Improved Method of making Permanent **Electrets,** and Factors which Affect Their Behaviour.—Good & Stranathan, **1287.**
Use of **Electrets** in Electrical Instruments.—Gemant, **2498.**
Electric Shock.—Special Report, Underwriters' Laboratories, **1686 ;** Lowering the Domestic Voltages to Safe Region below 65 Volts, **1687 ;** Safety Rules for Radio Installations, Nat. Bureau of Stds, **2833 ;** Accidents in Switzerland in 1939, **3712.**
Electrical Supply Equipment at Wireless Works, **4125.**
Production of **Electricity** by Muscular Force.—Hug, **2104.**
Electricity elicited by Organic Chemical Process.—Nachmansohn, **3711.**
Sir Ambrose Fleming's Method of **Electrification.**—Schnurmann : Morris, **1680** & **4141.**
Electroconvective Eddies : Nature and Application.—Avsec, **902, 903, 1286,** & **1681.**
Electrographic : see Printing.
Cerenkov Radiation emitted by Uniformly Moving **Electrons.**—Tamm, **2107.**
Electronic & Other Applications : see Anemometer, Book-Review, Cable-Faults, Cathode-Ray, Chemical, Coil-Tester, Concrete, Condenser, Control, Counting, Engine-Indicator, Fence, Fire, Fog, Gases, Heat-Control, Lightning (Hot), Micro-Analysis, Mills, Moisture, Molecular, Nurse, Optical-Activities, Photo-Engraving, Photographic, Piezo, Pipes, Polymerisation, Pressure, Printing, Speed, Spinning, Steel, Stethoscope, Stresses, Temperature, Tensiometer, Time-Telescope, Ultra, Vibration, Water, Watch.
Electron-Microscopes.—von Ardenne (Book Review), **4513 ;** Metallic-Oxide Smokes, **4514 ;** Brüche & Haagen (Application in Bacteriology), **1679 ;** Friess & Müller (Dusts & Smokes), **3660 ;** Mahl (Metallurgical), **2102 ;** Martin (Ultra-Violet & E.M. : Limits of Resolution), **4515 ;** E.M. Fellowship, **4137.** See also under "Subsidiary Apparatus & Materials."
How **"Emergency Coordinators"** Work.—Corderman, **1740.**
Encephalography.—893, 894 & **2823, 895,** & **2822.**
Energy Adsorbed in Irradiated Tissue [for X- and Gamma-Rays].—Happey : Mayneord, **4130** & **4131.**
Engine Indicators, etc.—1291 (Electromagnetic E.I. & Knock Meter) ; **2810** (Investigation of Knock with Electroacoustical Apparatus) ; **3689** (Piezoelectric Apparatus for Internal-Combustion Engines : Quartz & Rochelle Salt) ; **3690** (Condenser-Type High-Speed E.I.) ; **4176** (Admiralty Electromagnetic & C.R.O. Indicator). See also Pressure, Vibration.
Social Responsibility of the **Engineer.**—Doherty, **453.**
New Post-Graduate Course in Industry in High-Frequency **Engineering** [General Electric Company].—Stevenson & Ramo, **4112.**
Engineering Administration in a Small Manufacturing Company.—Burke, **454** & **1730.**
Errors of Observation in Physical Measurements.—Mahalanobis, **2093.**
Exhibitions.—Berlin, **405/7, 889,** & **2804 ;** Milan, **888 ;** New York World's Fair, **412 ;** Olympia, **403/5, 408/11 ;** Paris (Components), **2803 ;** Physical Society (Intended Entries), **2801 ;** Rome (Plans for 1942), **2490.**
Electronic **Fence Controller.**—Agnew & Place.—**3898.**
Lenticulated **Film** makes Pictures with Depth.—Winnek, **3655.**
Fresnel Formulae applied to Phenomena of Non-Reflecting **Films.**—Blodgett, **3658.**
Impedance of Bimolecular **Films.**—Dean, **1683.**
Films : see also Lens, Optical.
Determining **Film Thickness** with Recording Spectrophotometer.—Adams & Ickis, **440.**
Ionisation Chamber as **Fire Alarm.**—Jaeger, **3695.**
Electronic **Fire Detector, 4178.**
Radio for Parachute **Fire-Fighters, 4179.**
Dispelling **Fog** [including Effect of Micro-Waves and Use of Calcium Chloride Spray].—Compton, **2837.**
Exciting Flames for **Fog Signalling.**—Carrière, **4529.**
Effect of Electric Current on Growth of **Fungi.**—Hattori & Tamura, **3714.**
Activities of National Electrotechnical Institute **"Galileo Ferraris."**—Vallauri, **2797.**
Ionisation Surfaces and Their Mode of Action in Electrical Purification of **Gases.**—Brion, **1285.**
General Radio Company [Survey of 25 Years], **4115.**
Meeting of Society of **German Electrotechnicians** in Vienna, **448.**
Locating **Guns** by Seismic Methods, **2836.**
Gurwitsch or Mitogenetic Rays [Discovery & Significance].—Puig, **2109.**
Dielectric Investigation of Carbon Dioxide/**Haemoglobin** Solutions containing Impurities.—Arrhenius, **434.**
Electronic Relay for **Heat Control.**—Hall & Heidt, **4138.**
Aerodynamic **Heat-Engine Plant.**—Ackeret & Keller, **3699.**
Experiments with Colpidium Campylum (Microorganisms] in **High-Frequency** Electric and Magnetic Fields.—Summers & Hughes, **4134.**
Point Heating in **High-Frequency** Field.—Wenk, **2111.**
Dielectric Loss in **Ice.**—Murphy, **2846.**
New **Ignitron** Firing Circuit.—Klemperer, **1691.**
Impulse Rate Indicator [for Pulses or Movements up to 10 000 c/s].—Southern Instruments, **3702.**
Infra-Red.—Blake (with Special Reference to Quenching Effects on Phosphors), **2124 ;** Clark ("Photography by I-R" : Book Review), **4518 ;** Dahlke, **2125** & **3683** (300 μ Emission) ; Kremers, (Synthetic Single Crystals), **3682 ;** Malatesta (Electron Telescope for I-R Light), **1573 ;** Sanderson (Absorption by Fog), **3661 ;** Smith & Hayes (ditto), **4519 ;** Strong (Pyrometric Telescope), **2501.** See also Optical-Paths.
Physical Problems in Industry [Facilities offered by **Institute of Physics' Panel**], **4110.**
Institute Publication Procedure modified to Improve Service.—A.I.E.E., **4501.**
"Journal of **Institution of Electrical Engineers" :** Subdivision into Three Parts from January, 1941, **3259.**
Institution Recollections.—Atkinson, **421.**
Mutual **Interference** in Two Line Circuits Parallel to Each Other.—Hirota, **4122.**
Control of Inductive **Interference** to Telegraph Systems.—Milnor, **4521.**
Internal Friction of Single Metal Crystals [by "Composite Piezoelectric Oscillator Method].—Read, **4534.**
Interval Meter and Application to Studies of Geiger Counter Statistics.—Driscoll, **4532.**
Inventions win Wars [Advice to "Free-Lance" Inventors].—Wenstrom, **3274.**
Inventors and Legislation on Espionage.—Fernand-Jacq, **416.**
Electrometric Measurement of **Ionisation** Currents.—Jaeger, **2851.**
Absorbable **Ionising Radiations** emitted by Ordinary Metals.—Reboul, **1280.**
What the **I.E.E.** does for Its Members.—Heising, **4111.**
I.R.E.-R.M.A. Rochester Fall Meeting, **1721.**
Lagometer [on Condenser-Charging Principle for Time Measurements].—Bryan, **4153.**
Markets of **Latin America, 3261.**
Speed of f:2 **Lens** doubled by Thin Film of Evaporated Metallic Fluoride.—Cartwright, **3656.**

Miscellaneous—

Liesegang's Rings [as Result of Formation of Standing Electromagnetic Waves (between Micro-Waves & Infra-Red)].—Shemiakin & Mikhalev, **3713.**

Light : see Optical, Photometry, Stroboscopy, Vectographs.

Inductive Coördination with Series Sodium Highway **Lighting Circuits** [and Noise in Exposed Telephone Lines].—Kent & Blye, **446.**

"Hot" **Lightning** used in Transformer Tests, **898.**

"Lightning" Radiation [near Soft X-Ray Region] emitted from Lightning-Arrester Insulation.—Berkey, **2842.**

Current **Literature,** *and* Booklets, Catalogues, and Pamphlets, **1733.**

Sir Oliver **Lodge :** a Great Scientific Teacher, **4102.**

Longitudina. Circuit [formed by Two Wires and Ground : Introducer of Noise & Crosstalk].—Shetzline, **1719.**

Lucite Instrument Cases, **4187.**

Luxmeter [for Biological Determinations, Process Control, etc.].—Carson, **3677.**

Apparatus for Detection of **Magnetic** Materials.—Johnson & Field, **449.**

Electro-**Magnetic** Grain Cleaner, **1298.**

Earnshaw's Theorem and Attempts at Stable Suspension in Space by **Magnetic** Means.—Tonks, **2100.** See also **4535.**

Magnetic Strain Gauge for Aerial-Cable Sheath, **2807.**

Metallic Sphere in Homogeneous Alternating **Magnetic Field** and Application to Theory of Induction Furnaces.—Divilkovsky, **2099.**

Researches on Biological Effects of **Magnetic Field.**—Lenzi, **3709.**

Magnetic Inspection of Metals.—**443, 444, 1297, 1694, 1695, 2101.**

New **Magneto-Optical** Action.—Majorana, **445.**

Stress Measurement by **Magnetostriction.**—Smith & Luxford, **4175.**

Mercury Poisoning [Danger for Experimental Workers].—Giese, **3250.**

Portable "Howling" Detector for **Metal Buried in Logs.**—Forest Service, **3697.**

Cosmo-Physical Disturbances of Ionosphere, Troposphere, and Biosphere [with Particular Reference to **"Meteoropathy"**].—Düll & Düll, **3277.**

"Essai de **Météoropathologie :** Physique, Clinique, Thérapeutique" [Book Review].—Kopaczewski, **4135.**

Micro-Analysis of Gases by Physical Methods.—Ransley, **4172.**

Survey of Methods and Apparatus for **Micro-Gas Analysis.**—Hartridge, **433.**

"Electric Ear" for Control of Feed to **Mills, 2813.**

Moisture Meter for Textile Materials.—Jones, **2812.**

"Blinker" Electrical **Moisture** Meter.—Thomas, **1703.**

Sensitive Method for Determination of **Moisture.**—Vincent & Simons, **3685.**

Researches on High-Frequency Discharges and Application to **Molecular Spectroscopy.**—Mesnage, **1288.**

Naming of Scientific Instruments.—Williamson, **3258** & **4117.**

Electrical Functioning of **Nerve.**—Beau & Fischgold, **2826.**

Argument for Chemical Mediation of **Nerve** Impulses.—Cannon, **1684.**

Induced Currents and Effect on **Nerves** of Inhabitants of Ferro-concrete Buildings.—Denier, **2830.**

Nervousness Meter.—Jacobson, **1685.**

"Radio **Nurse**" for Hospital or Home Use, **1290.**

Measurement of Small **Optical Activities** with Quartz-Crystal Light Modulator.—McKinley, **432.**

Improvement of Brilliancy of **Optical Apparatus.**—Smakula, **3657.**

Method for obtaining Long **Optical Paths.**—Smith & Marshall **4520.**

Coating **Optical Surfaces** with Aluminium.—Sivaramakrishnan, **3659.** For Optical see also Lens.

Theory of [Mechanical] Auto-**Oscillations** produced by Forces effective by Virtue of Their Position only.—Strelkov, **2489.**

Unique **Oscillographic** Demonstrations.—Hoecker & Asher, **3708.**

Inventors and War : Changes in **Patent** Law, **418.**

Assignment of Right of Priority [in **Patent** Law].—Fernand-Jacq, **417.**

Communications Engineering in **Patent** Statistics, 1938, **1714.**

Patents—How to Write and Understand Them.—Goldsborough, **2805.**

RCA and **Patents.**—Schairer, **3651.**

Penetration of Rays through Skin, and Radiant Energy for Treatment of Wounds.—Hill, **1279.**

Photocells.—Fink & Mackey (Bismuth-Sulphide), **4167 ;** Fridland (Filters for Selenium Cell), **3674 ;** Glover & Janes (High Sensitivity in Green, Blue, & Near U-V), **4538 ;** Larson & Salinger (Multiplier Tubes), **4168 ;** Lukyanov (Antimony-Caesium, for Stars), **2496 ;** R.C.A. (Reference Chart), **4164 ;** Rodionov, Kubetski (Multi-Stage, for Low Intensities), **2495 ;** Rössler (Selenium Cell, for Short-Wave U-V : Quartz Cover-Glass), **1272 ;** Sargrove (Barrier-Layer Cells in Differential Circuits), **4159 ;** Timofeev (with Multi-Stage Amplification on A.C. Voltages), **4539.**

Photocell Applications.—Calibration of Exposure Meters, **1278 ;** Simplified High-Sensitivity Exposure Meter for Enlarging, **3267 ;** Time-Interval Meter for Camera Shutters, etc., **3273 ;** Exposure Control for Standard Enlargements, **4155 ;** Mercury-Vapour Detector, **439 ;** Application of Sound Film to Harmonic Analysis, **1271 ;** Area of Leaves, **2122 ;** Earthquake Analyser, **3270 ;** New Types of Regulating Devices for Commercial Purposes, **3271 ;** Electricity-Meter Calibration, **3272** & **3682 ;** Flow Meter, **3668 ;** Frequency Meter, Revolution Counter, **3669** & **3670 ;** Lighting of School Classes, **3671 ;** Hot Flame Gases, **3672 ;** Air-Brush for Picture Enlargement, **3675 ;** Particles in Dusty Air, **3678 ;** Accelerated-Flow Method for Rapid Reactions, **3679 ;** Foodstuff Industries, **3680 ;** Robot Look-Out for Forest Fires, **3683 ;** Two-Colour Pyrometer, **3684 ;** Smoothness Meter for Surface Finish, **4161 ;** Relay for Control of Smoke from Flues, **4162 ;** Pinholes in Steel Strip, **4163 ;** Furnace Temperatures, **4537 ;** Measurement of Scale Marks, Spectrum Lines, Areas of Maps, Leaves, etc., **4540** & **4542.** See also Amplifier, Book-Reviews, Light, Photometry.

Electrical **Photo-Engraving.**—Thorne Baker, **4543.**

Action exercised by Ordinary Metals on **Photographic** Plate.—Reboul, **2108.**

Photographic : see also Film, Lagometer, Photocell-Applications, Time-Telescope, Timer.

Photometry.—438, 1273, 1276, 1707/1711, 2123, 3266, 3268 3664/7, 3676, 3677, 3681. See also Densitometer, Spectrophotometry.

Can Modern Science harmonise **Physics** and Biological Phenomena ?—Swann, **4133.**

Teaching of **Physics** in Schools and Technical Institutions.—Barton : Owen, **1727.**

Application of **Piezoelectric** Vibration Pick-Ups to Measurement of Acceleration, Velocity, and Displacement.—Baumzweiger, **1702.**

Activation of Liquids by **Piezoelectricity.**—Piccardi, **2827.**

Piezo-Quartz Dynamometer for measuring Impact Stresses.—Andreevski, **1294.**

Piezoelectricity : see also Dry-Friction, Electronic-Applications, Internal-Friction, Pressure.

Damped Electromagnetic Waves in Hollow Metal **Pipes.**—Melloh, **3275.**

Polymerisation Processes in Electric Discharges.—Schechter & Syrkina, **4140.**

Bioelectric **Potentials** of Hen's Egg.—Romanoff & Cottrell, **896.**

Analogy between Theories of **Potential and Vibrations.**—Jeffreys, **4475.**

Pressure Measurement, etc.—449 (Cell for Earth Ps.) ; **1293** (P., Movement, Acceleration, etc., by Capacity Change) ; **1295** & **2853** (Piezoelectric versus Spring P. Gauges) ; **1692** (P. of Soil on Tunnel Casing) ; **2811** (Metropolitan-Vickers Capacity-Change Manograph) ; **2850** (Capacity-Variation Circuits & Instruments) ; **3687** (Sensitive Automatic Pressure-Control Device) ; **3688** (Cossor-Dodds Condenser-Type P.M. Unit). See also Piezo, Ultra-Micrometer.

Printing Techniques in Analytical Chemistry, *and* Electrographic **Printing.**—Hermance : Anon, **3694.**

Prospecting.—Enenstein, **4144** (by D.C. on Frozen Ground) ; Fritsch, **430, 1677,** & **3704 ;** Kagan, **2834** (Petroliferous Rocks) ; Kodawaki, **4510** (Reflection, Refraction, & Absorption on Rocks) ; Löwy, **2118** & **3705** (Iso-Dielectric Lines : Electrodynamic Hydrology) ; MacKinnon, **4143** (Ground Conductivity in Canada) ; Murphy, **4142** (Mobile Seismic Recording Unit) ; Nash & Palmer, **3703** (Reflection Seismograph P.) ; Puig, **2116** (Wandering Currents) ; Silverman, **1281** (Search for Oil) ; Taft, **2121** (Portable G.M. Counters). See also Buried-Cables, Metal.

Radiation : see Electrons, Ionising, Lighting, Photographic-Plate.

Some Contributions of **Radio** to Other Sciences.—Dellinger, **413.**

Modern **Radio Plant Practice.**—Chase : Stromberg-Carlson, **1731.**

Radio-Therapy in Medicine [including 3–30 m Waves and the Specific, Athermic Action].—Dalton, **1284.**

Radium Exposure Meter.—Curtiss, **450.**

Relaxation Oscillations.—Herrender-Harker, **3710.**

Research.—Scientists pool Resources in 60 000 Dollar R. Plan, **419 ;** National Centre in France, **420 ;** N.P.L. Research, **1725** & **2796 ;** "G. Marconi" Radioelectric Centre, **1726 ;** Applied R. and Collective Organisation (Bertin), **1737 ;** R. in 1939 (Met.-Vickers), **1738 ;** Organisation of R. in France, **2789 ;** National R. Council for India, **3262.**

"Serendipity" [Origin & Examples : Gradual Elimination of Chance Discoveries by Organised **Research**], **4113.**

Measurement of **Rheological Properties** of Some Industrial Materials.—Scott Blair, **4174.**

Work on Live Wires : Experiments with Equipotential **Rubber Gloves.**—Kervan, **452.**

Cleveland's Ultra-High-Frequency **School Radio** System.—Woodward, **428.**

Rôle of **Science** in Electrical Industry.—Smith, **2798.**

Programmes of **Scientific Meetings** (Criticism, and Plea for Equal Times for Paper and Discussion].—Mendenhall, **3256.**

Case History of a **Scientific News Story.**—Simpson, **4186.**

Shock Waves in Air and Characteristics of Instruments for Their Measurement.—Thompson, **4531.**

Symbolic Representation of Scales of Logarithmic **Slide Rule.**—Schendell, **1289.**

Device for Viewing of **Slow** Rotary Motions.—Sutton, **2859.**

New Method of rendering Poisonous **Snake** Harmless.—Jaros, **3715.**

Spectrophotometry.—Bosch & Brown, **1274** & **1275 ;** Harrison & Bentley, **4156 ;** Jacobsohn, **4157 ;** Sheard, **4158.** See also Film-Thickness, Photometry.

Miscellaneous—

Measuring and Automatically Regulating **Speed** of Ultracentrifuge. Björnståhl, **435.**

Problem of **Sphere** placed in Homogeneous Alternating Magnetic or Electric Field.—Divil'kovski, **891.**

Ionic Probe for Micro-Manipulations, Boring of Extremely Small Holes for **Spinning Technique,** etc.—von Ardenne, **1696.**

Standardisation for Home and Export, **3260.**

Heat Treatment of **Steel** by High-Frequency Currents.—Babat & Losinsky, **2119** & **2120.**

Sterilisation of Food by Glow Discharge in Low-Pressure Gases or Vapours.—Toriyama & Takada, **1682.**

Industrial **Stethoscope** [for diagnosing Condition of Running Machinery], **2855.**

Variable-Frequency **Stimulator.**—DuMont Laboratories, **4511.**

Investigation of Rapidly Changing Mechanical **Stresses** with Cathode-Ray Oscillograph.—de Bruin, **1697.** Cf. **2808.**

Stroboscopy.—Drewell, **1704** ; Ewest, **798** & **2818** ; Fox & Rock, **900** ; Kallmann, **437** ; Kern, Schiller, **901** ; Schiweck, Siemens & Halske, **3654** ; Sinclair, **2819** ; Street, **2820** ; Sturm, **2497.** For slow rotary motion see Sutton, **2859.**

Surveys of Progress.—(Developments in 1939), **1734/6, 2799, 3265** & **4114** ; (Progress 1914–1939), **414** ; Scroggie (American Progress in Wireless Technique, and Ours), **415** ; Sarnoff (Vision of Future Developments), **1729** ; Overbeck (Recent American Advances in Experimental Physics), **1722** ; Henney (Decade of Electronics, 1930/40), **2802** ; Dinsdale (Review of American Radio), **4118** ; Sublet (Significant Trends in Electrical Engineering), **4500** ; Rettenmeyer (Expectations in Radio for 1940), **1739** ; Weinberger (Economic Trends in Radio Industry), **427.** See also Science.

Electronic **Switch** for Fluorescent Lamps.—Hays, **4149.**

Discussion on "Quadrature **Tachometer.**"—Geyger : Brown, **436.**

Carrier **Telemetering** with Metameter [Impulse-Duration Telemeter].—Bristol, Lunge, **1716** & **4188.**

Special Issue on Measurement and Control of **Temperature, 4536.**

Constant **Temperature** Control Apparatus, utilising Special Type of Voltage Regulator.—Blair, **4139.**

Direct-Reading Vibrating-Ribbon **Tensiometer.**—Egidi, **1296.**

The Late Sir Joseph **Thomson,** O.M., F.R.S., **4473** & **4474.**

Time Telescope [for Automatic Control of Motion-Picture Camera for Study of Plant Growth, etc.].—Dudley : Veber, **899.**

Electronic **Timer** [for Bromide Printing, etc.].—Norton, **4154.**

Effect of Temperature and Exposure to X-Rays upon **Triboluminescence.**—Wick, **431.**

Action of **Ultra-High-**Frequency Electric Field on Hydrophobic Sols.—Eristawi & Barnabischwili, **3706.**

Low-Power **Ultra-High-**Frequency Diathermy Apparatus.—Hutchins, **2824.**

Ultra-Micrometer Technique.—Electrolimit Gauges, **2854** ; Ellwood (Magnetic U.M. for Thin Films), **4170** ; Feldbaum (Precision Checking of Dimensions), **4533** ; Froböse & Schönbacher (Electric Gauge), **1700** ; Gunn (Thermionic Micrometer), **1701, 3686,** & **4171** ; Hobbs (Electric Moment of Molecules, using U.M. Technique), **3692** ; Quevron, Nicolau (Microgeometric Examination of Surfaces), **3693** ; Rusher (Thickness Gauges for Thin Non-Magnetic Layers), **1292** ; Sargrove (Space-Charge Coupling), **4169** ; Stephenson (Thickness of Thick Cellulose Films), **904.** See also Electronic-Applications.

Ultra-Rapid Cinema with 80 000 Images per Second : Application to Scientific Research in Engineering.—Nierenberger, **1705.**

Bibliography on Effects of Short and **Ultra-Short** Waves on Human Organism, **2829.**

"Ergebnisse der Biophysikalischen Forschung" [**Ultra-Short** Waves and Their Medical-Biological Applications : Book Review].—Dänzer, Hollmann, **2114.**

Effect of **Ultra-Short** Waves on Tissue Cells.—Hasché, **2112.**

Ultra-Short Waves : Physics, Technique, and Fields of Application.—Hausser, **1676.**

Effect of **Ultra-Short** Radio Waves on Plant Growth.—van Overbeek, Brantley, & Potapenko, **892.**

Question of Specific Action of **Ultra-Short** Waves.—Theis, **3707.**

Ultra-High, -Short : see also Atoms, Fog, High-Frequency, Liesegang's, Radio-Therapy, School-Radio, Vegetable, Water.

Physiological Effects of **Ultrasonics.**—Ponzio, **1674.**

Killing of Bacteria with **Ultra-Violet** Light.—Downie Smith, **4132.**

Valve Circuit Conventions.—G.W.O.H. : Bell, **2096** & **2792.**

Vectographs : Images in Terms of Vectorial Inequality, and Application.—Land : Polaroid Corporation, **3853.**

Action of Micro-Waves on **Vegetable** Cycle of Different Vegetables. —Mezzadroli, **1675.**

Vibration Meters, etc.—**2499** (Electrodynamic Detector of Mechanical Vibrations, and Its Applications) ; **2808** (Vibration Stresses of Aeroplane Parts measured during Flight : Graphite Strips : cf. **1697**) ; **3691** (New Electrodynamic V.M. requiring No Amplification) ; **4177** (Measurements of Noise & Vibration) ; **4530** (Linear Systems used in V.Ms.). See also Aircraft, Airscrew, Engine, Impulse-Rate, Piezo, Potential, Shock-Waves, Stethoscope, Stresses, Tensiometer.

"International Electrotechnical **Vocabulary,**" **3652.**

High-Speed Motion Pictures of Human **Vocal Cords.**—Farnsworth, **2821.**

Watch-Testing and Water-Leak Detection by Electronic Means.—Taylor, **2126.**

Energy Distribution in Near Zone of Transmitting Dipoles under **Water,** with Use of Reflectors.—Pätzold & Osswald, **3276.**

Water-Leak : see Watch-Testing.

Water-Level Indicator.—Ware, **2849.**

Automatic **Water-Stage** Transmitters.—Kennedy, **2127.**

Welding Control.—Simplified Precision Resistance-Welder Control, **1689** ; Ignitron Contactor Control, **1690** ; Feedback Timer for Small-Parts Welding, **2814** ; Automatic Timer for Small-Parts Welding, **2815** ; Electronic Control Gear, **2816** & **4151** ; Arc Stabiliser, **2817** & **4150** ; Timing by Steel Ignitrons, **4152.**

Evolution of Methods of Transmission by **Wire.**—van Mierlo, **2844.**

I.E.E. **Wiring Rules, 422.**

X-Ray.—Allibone, Bancroft, & Innes, **1713** (St. Bartholomew's Hospital Million-Volt Tube) ; Charlesby, **4517** (Action of Electrons & X-Rays on Photographic Emulsions) ; Charlton & Hubbard, **4129** (1 400 000-Volt Constant-Potential Equipment with Sharply Focused 10 mA Electron Beam) ; de Graaf, **2840** (Macroscopic Examination of Materials) ; Haworth, **2839** (Determining Orientation of Crystals : Permalloy) ; Oosterkamp, **1712** (X-Ray Photographs with Extremely Short Exposures) ; Orlov, **4128** (X-Raying of Commercial Goods, Detection of Spots of Different Density) ; Rooksby, **2841** & **4126** (Applications to Industrial Laboratory Problems) ; Slack, **4127** (Millionth of a Second Exposures). See also Energy.